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June 27, 1949

STEEL

The Magazine of Metalworking and Metalproducing

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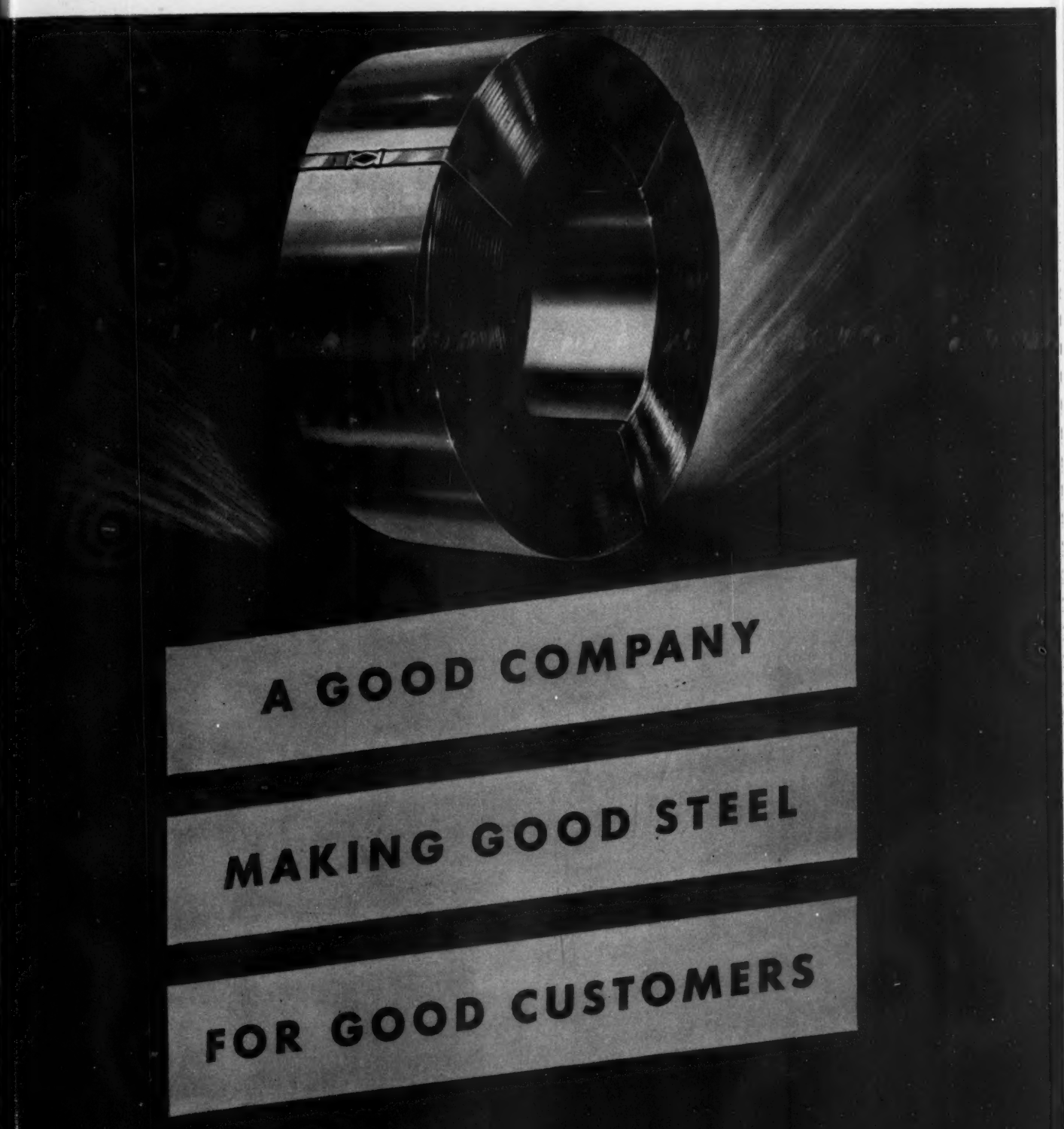

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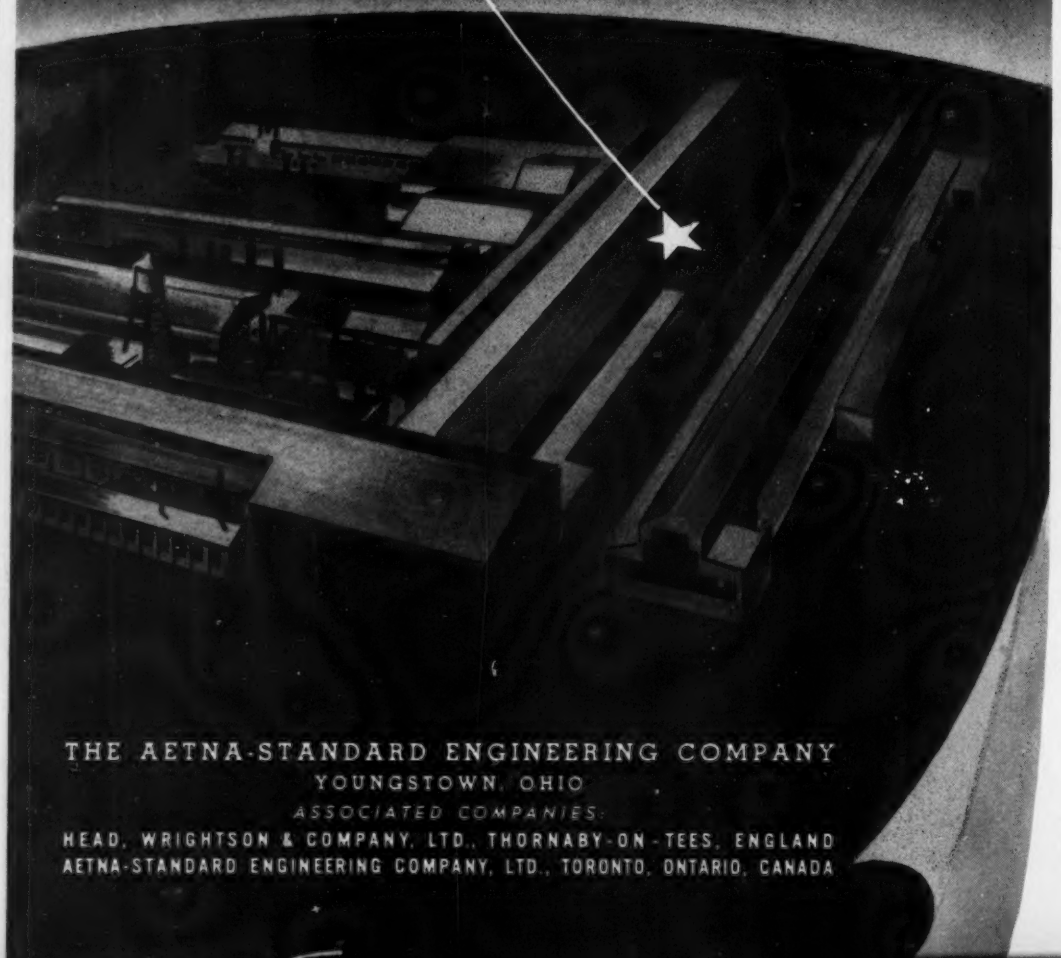

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Behind the Scenes...

Conventional Report

We wilted our way through the NIAA convention at Buffalo week before last and picked up a lot of interesting things which we will pass along to all you readers. Probably the high spot of the week was the talk made by David Austin of U. S. Steel. Or maybe we just thought it was the highspot because it agreed so well with our thinking about industrial advertising. The convention item which received the biggest play in the Buffalo papers was a brief talk by E. L. Shaner, of whom you may have heard. If you haven't heard of him, move immediately to pages 23 and 24, where he is waiting to talk to you. One of the best gags of the week came from the editor of an automotive paper, who noted that the public is becoming dissatisfied with these new cars that are narrower on the outside but wider on the inside. Seems that they are having no trouble getting the outside of the cars into the garage, but they can't get the inside in! And certainly the low spot of the convention was the night they gave away a television set. The first three tickets pulled belonged to persons who had left the room, and two of these were offering each other condolences in our room later that evening. They were *really* low! Chief benefactors of the convention were the laundries, dry cleaning and pressing establishments who worked all day and all night trying to remove some of the steam which had been applied the previous day by that *unusual* Buffalo weather.

Add Reprints

The Packard folks seem to be most appreciative of Art Allen's efforts. That article of last month on the history of Packard has been re-reprinted, with over 20,000 copies now going out. That includes one for every Packard employee. There are a few more loose ones kicking around our printshop, according to the Readers Service Dept., and we'd be happy to shove one your way if you'd like it. Just drop us a line.

Back Fifty

Must have been quite hot fifty years ago this week, because there is little startling news in the pages of our June 29, 1899 issue. New records are being set in the plants, however, in iron and steel production; in ore shipments; and in prices, which continue to climb to the accompaniment of much editorial head wagging. The hot weather has apparently had its effect on labor, because tin mill wage negotiations have become stalemated, and in Cleveland a foundry is on strike because the foreman rode on a street car manned by a non-union operator. The Pennsylvania Railroad announces special half-price fares for excursions over the Independence Day holiday, and Phoenix Horse Shoes are the Best Shoes Made, according to our advertisers.

Puzzle Answer Corner

While we don't want to disillusion any of you old time tennis stars who worked out the pairings on our puzzle of two weeks ago—and while we also admit that your answers of 77 matches were quite correct, perhaps in all fairness we ought to point out that the easiest way to solve the problem is to figure that one player is eliminated by each match; that there are 78 players; that therefore you want to eliminate 77 players in order to have one champion and that will take exactly 77 matches! We hope you hard working matchers will now quit arguing about how many byes are going to be drawn!

Rough Advertising Policy

We note that last week's issue carried another one of those inserts from the Norton Co. which are really rough. We always figured they were covered with real, honest-to-goodness samples of Crystolon, or 32 Alundum, or something, but somebody around here who ought to know says it isn't at all. In fact, according to our source of information, the abrasive is really just dry gum, which dissolves in water. Could be, but in the absence of any confirmation from Worcester, Mass., we'll simply report that they are abrasive enough to make good nail files! And while we are on the subject of Norton, we'd like to add that they put on a real show in Buffalo for the NIAA'ers. Complete with flashing lights, colored slides, black light, and at least nine people.

Shrdlu

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STEEL

Vol. 124—No. 26 June 27, 1949

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Sheet Shearing Facilitated By Efficient Handling

A Simplified Lubrication Plan for Machine Tools

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STEEL

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★ Denotes Regular Features.

WHAT'S THE Important Difference BETWEEN Carbon Steels and Alloy Steels?

No SINGLE characteristic denotes the real difference between alloy steels and carbon steels.

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Yes, in the final analysis, it is the better, more complete *combination* of properties—and, therefore, better performance and long-range economy—available in the nickel alloy steels which constitutes the most significant difference.

We shall be glad to furnish counsel and data to help you select the right nickel alloy steel for your requirements.

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

June 27, 1949

Unlimited Opportunity

Within recent months there has been a noticeable trend on the part of public relations specialists in industry to find ways to give students and educators a better understanding of industry's aims and activities. This spurt of interest is the result of a frank admission that in many instances industry has not done as good a job on the campus as have the proponents of socialism and communism.

A good illustration of one approach to this problem is the excellent illustrated book entitled "Steel Making in America" now being distributed by United States Steel Corp. to science teachers, public libraries, high and junior high schools and junior colleges throughout the country. Board Chairman Irving S. Olds states that it is the corporation's wish that the book "will afford to students and laymen alike an opportunity to become more familiar with the history and operations of the American steel industry and the products it produces. . . ."

Another example is found in conferences that are being held where educators and industrialists exchange views. At a meeting of this kind in Cleveland last week the president of an Ohio university recommended that colleges set up advisory committees from industry, that more educators participate in labor-management conferences, that students be given more opportunities to inspect industrial operations and that industry offer summer vacation employment to instructors and students.

All of these efforts to provide students and educators with a better understanding of American industry are commendable. The more sound information that becomes available, the better will be the end result.

However, a word of caution as to technique is in order. In every phase of industry's campaign to better serve the personnel in the nation's institutions of learning the emphasis always should be on what the students and instructors need and want and not on what industry thinks they should have.

The ideal situation would be one in which representatives of industry are constantly in such close touch with educators and are so familiar with their problems that these educators will instinctively turn to industry for assistance. On such a basis of mutual understanding, opportunities for industry to assist in preparing young people for life in our complicated economy would be almost unlimited.

* * *

BACK TO NORMAL AGAIN: Now that midyear finds steel supply practically in balance with demand, one can look back at the factors which led to the present situation.

Perhaps the first easing of steel demand developed last August when the makers of household equipment and appliances began to curtail production. At the time, the reduction in buying by this group of customers was scarcely noticeable in overall demand for steel because other consumers—particularly in the automotive field—not only took up this slack but they also absorbed the increased supply as new productive capacity came into operation.

Later in 1948, when one by one other steel consuming groups began to cut back operations, steel tonnage thus freed still was eagerly sought by customers who were still operating at capacity. However, the unprecedented output of steel in the first quarter of 1949 rapidly was cutting down the backlog of orders. Further reduction in demand in the last few months has completed

(OVER)

AS THE EDITOR VIEWS THE NEWS

the cycle which has brought supply into balance with demand.

The present outlook is for a continuing downtrend. Purchasing agents at the Chicago convention last week reported more than adequate steel stocks in all industrial areas with further cuts in inventory scheduled. They also believe that reductions in steel prices are inevitable.

A few products, such as pipe and some flat-rolled items still are tight but there is every indication that all types of steel will be plentiful in 30 to 60 days. —pp. 29, 32, 107

* * *

BUILDING NEW PLANTS: In spite of present business uncertainties a substantial volume of construction of new plant and equipment continues. The 6-year, $9 billion postwar electric power program undertaken by the privately owned electric utilities now is at its peak. Work on the program will be completed in 1951.

In a few weeks Dearborn Motors Corp., marketing organization for Ford tractors and Dearborn farm equipment, will break ground for a $2.5 million general office building, laboratory and parts warehouse near Birmingham, Mich. Lincoln Electric Co., after several postponements, has given the go-ahead sign on erection of an $8.5 million modern, windowless plant.

These are a few of many current expansion projects which indicate that management knows that in the case of numerous companies the use of highly efficient plant and equipment will pay handsome dividends in tomorrow's competitive market. —pp. 31, 44, 46

* * *

MOVE FOR EFFICIENCY: Whatever anyone may think of the present Congress, it now has a new, important accomplishment to its credit. It has passed the Reorganization Act of 1949, thus paving the way for putting into effect some of the recommendations of the Hoover Commission on Organization of the Executive Branch of the Government.

Passage of the bill puts it squarely up to President Truman to do a real job in transforming the "sprawling, wasteful and inefficient bureaucracy" of the executive department into a smoothly functioning organization. Mr. Truman consistently has indicated strong support for the Hoover objectives and the passage of enabling legislation gives him an opportunity to demonstrate his sincerity.

However, the recommendations affecting the executive branch of the government represent only a portion of the fine work of the Hoover collaborators. There remains for Congress abundant opportunity to cash in their other proposals, many of which would result in substantial savings to taxpayers. —p. 36

* * *

OUR MILLS PREFERRED: If programs submitted by ECA-participating nations to Organization for European Economic Cooperation for 1949-50 are approved, orders for $118,208,000 of a total of $152,027,000 for equipment for iron and steel production will go to manufacturers in the United States. Of the portion to be supplied by American builders, equipment valued at $33,700,000 would go to France, $22,423,000 to Benelux countries, $17,500,000 to Italy, $16,550,000 to the United Kingdom, $16,350,000 to Austria and lesser amounts to Denmark, Greece, Norway, Portugal, and others.

For the entire ECA program covering the period from 1948 to 1953, expenditures for equipment for iron and steel production are estimated at $554,446,000, of which $363,367,000 would go to American manufacturers.

Much of this is tentative, but the heavy percentage apportioned to builders in the United States is significant. In all frankness, it could be said that our nation as sponsor of the program would favor our own builders. An equally plausible explanation is that today American iron and steel production equipment is preferred throughout the world. —p. 39

* * *

BUFFS AUTOMATICALLY: Sooner or later, many of the operations in the metalworking industries which seemed to be destined to remain as manual chores become mechanized. One of the latest developments in this trend is the introduction by Ford Motor Co. of machines which buff hub caps automatically. The installation supplants the traditional practice whereby buffing was performed manually by workmen who held the hub caps against buffing wheels on conventional stand-type machines.

This development is the logical outcome of mass production. With about 3 million hub caps to be buffed, the incentive to reduce the cost of manual operations was compelling. Solution of the problem was found in the use of 12-station indexing machines, on which hub caps could be mounted for treatment by floating-head buffing lathes. It is a clear-cut case wherein volume justifies extensive mechanization. —p. 62

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

BACK TO NORMAL— End of the first half of 1949 finds steel demand and supply about in balance in most products (p. 29). But how long this balance will be sustained is of concern to producers; with new ordering continuing to show a tendency to shrink, there is speculation as to whether the pendulum of demand will swing as sharply below production capacity as it swung above during 1946, 1947 and 1948. Decision of the secretary of commerce not to ask Congress to extend voluntary steel allocations beyond Sept. 30 and further abandonment of steel company quota limits on steel distribution are evidence the steel shortage is past. The shrinking demand is being felt keenly by some of the high-cost handmills which had been saved from extinction only by the postwar pressure for steel.

MOVING AHEAD— The Senate-passed O'Mahoney bill to clear away confusion over pricing and permit freight absorption has been approved by the House Judiciary Committee (p. 30). Although increased rail freight rates make full return to the former basing point pricing method prohibitive, the growing competition for business will undoubtedly make steelmakers increasingly desirous of absorbing freight.

DEMANDS RESISTED—Big labor's wage and pension demands continued to meet resistance last week (p. 30), and there was speculation that in event of a strike of steelworkers they would seek government help in collecting full pay for work time lost.

MORE POWER—The nation's six-year, $9 billion electric power expansion program is at its peak (p. 31), with new power plants, transmission and distribution systems and internal equipment going up at a rate of more than $5 million daily. Over $2 billion will be paid out this year, and some seven million kilowatts of additional capacity will go on before 1949 ends. The program, to be virtually complete in 1951, will boost privately owned capacity 52 per cent over that existing at the end of the war.

LIKE OLD TIMES— Prices replaced supplies as the subject for major discussion at the annual convention of the National Association of Purchasing Agents (p. 32). The return to a buyers' market in virtually all products was evident in formal sessions, corridor chats and exhibits.

ADJUSTING—The fastener industry is readjusting downward to normal levels of inventories and production for peacetime (p. 33). Although the appliance industry's demand for fasteners has shown a sharp dip, the requirements of auto builders, farm implement manufacturers and aircraft producers have held up well. A new field of demand for fasteners has developed with the rise of the television industry.

NEW SALES METHOD— Success of the regional machine tool exhibition in Vermont (p. 34) gives rise to belief that similar shows are likely to be staged until the machine tool industry feels the time is appropriate for a national show of the caliber held in Chicago in 1947.

HERE AND THERE IN INDUSTRY—In the interests of brevity and descriptiveness the American Institute of Bolt, Nut & Rivet Manufacturers is changing its name (p. 33) to Industrial Fasteners Institute . . . . Cleveland Electric Illuminating Co. sees no lag in long-term industrial growth (p. 35) and is expanding its development program . . . Heavy backlogs for structural steel fabricating are reported to be taking up much of the slack in declining business (p. 35) . . . . Youngstown Sheet & Tube Co.'s president says steel price cuts are unlikely (p. 35) in view of necessity to spread fixed overhead charges over a declining number of tons . . . . Substantial bulk of capital equipment needed for Europe's iron and steel producers will be imported from the U. S. (p. 39) . . . . Timken Roller Bearing Co., Canton, O., celebrates its fiftieth anniversary (p. 46).

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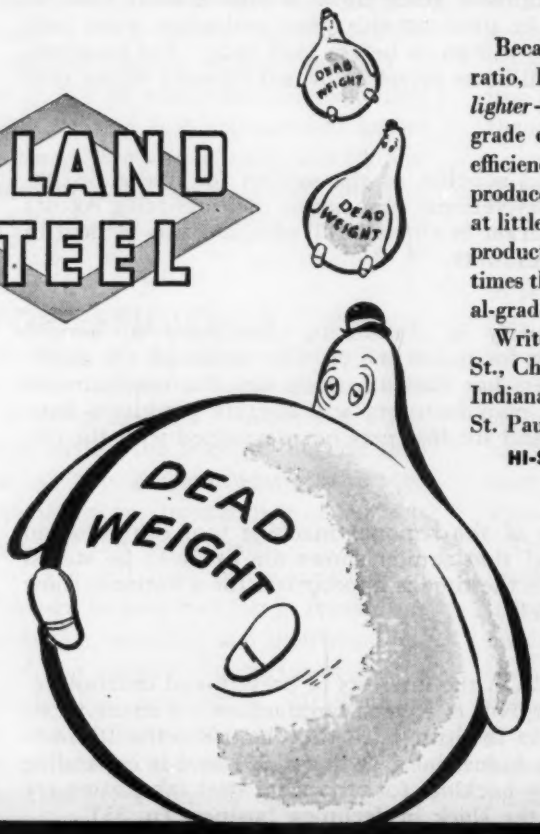

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STEEL
A PENTON PUBLICATION

Steel Supply Back to Normal

Midyear finds postwar shortage over for all practical purposes. Relatively quick deliveries available in most products with new buying limited. Mill backlogs shrinking

MIDYEAR finds overall steel supply about in balance with demand. A few products, such as pipe and flat-rolled, still are relatively tight, but for all practical purposes the postwar steel shortage is over.

Flat-rolled products still are not available as quickly as certain other products. Some pipe items also are relatively tight. But even in these categories supply conditions are easing steadily. Supply-demand balance in flat-rolled appears only a matter of a few weeks away at most. It was reached in alloy steels and specialties months ago, and over the past quarter supply has caught up with demand in such previously tight supply items as plates, shapes, hot rolled bars, cold-finished bars and other products.

Shipments Shortened—As a result of the easing in demand and high-level production by the mills, shipment delivery dates have been shortened markedly on most products. Except for pipe and the flat-rolled items, chiefly galvanized and enameling sheets, quarterly quota limitations to consumers have just about been abandoned. In fact, since beginning of the current quarter consumer quotas have served more as goals for mill salesmen rather than definite mill commitments to customers.

Return to Normal—Removal of quota restrictions is a definite sign of the return of prewar distribution policy in steel markets. These quotas, it will be recalled, were set up when postwar demand exceeded supply. Quotas were governed by the customer's historical position on mill order books.

As a result of changing supply conditions in sheet steel, repercussions are felt among nonintegrated producers of flat-rolled steel items. Now that steel is in increasingly plentiful supply they find the going increasingly rough with competition keener.

Only Few Remain—Only a few of these small nonintegrated mills remain. They had been rapidly fading out of the picture prior to the war. Currently this trend is being resumed. Latest to join the list of those that have suspended operation or plan to suspend is the Superior Sheet Steel Division at Canton, O., of the Borg-Warner Corp. This plant was acquired in December, 1946, when the steel shortage was extremely acute.

The Superior Sheet Steel action follows that taken by owners of the Apollo sheet plant at Apollo, Pa. This latter goes out of production at end of June. Efforts of Apollo community leaders to purchase the plant with a view to operating it failed, and last week it was purchased by the M. N. Landay Co., Pittsburgh, which plans to either scrap or sell the mill equipment.

Another small mill, Valley Mfg. Co., New Castle, Pa., which was set up by Hudson Motor Car Co. during the period of steel shortage, also is planning to close up next month.

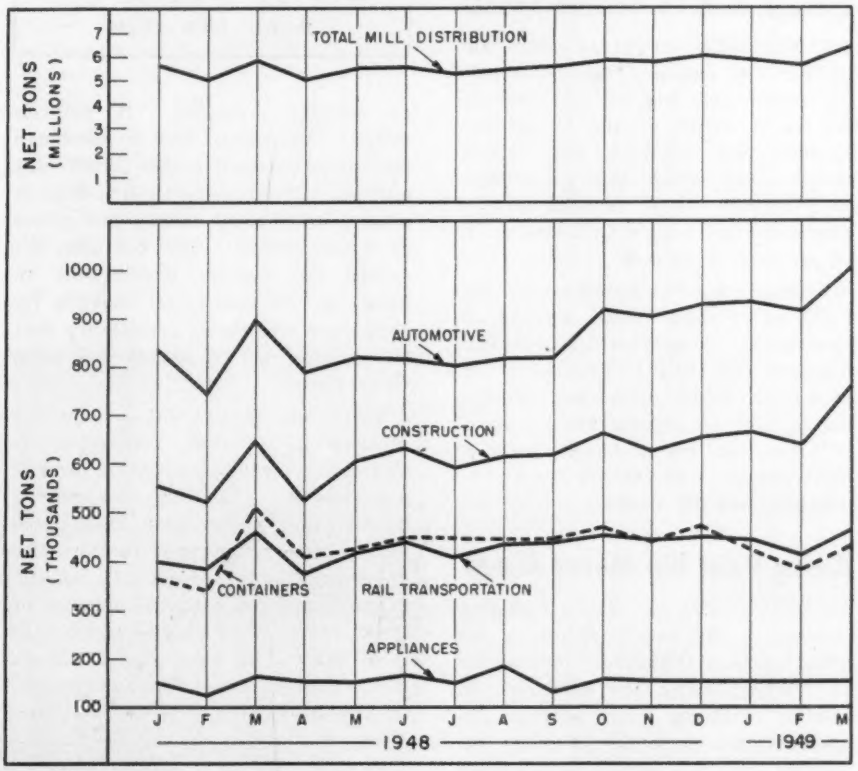
ALLOCATIONS TO DIE

COMMERCE Department Secretary Charles Sawyer has decided not to ask Congress to extend voluntary allocations agreements authority beyond the Sept. 30 expiration date.

Autos Hold Lead as Steel User

THE AUTOMOTIVE industry, largest

WHY STEEL DEMAND HASN'T DROPPED ABRUPTLY



Why demand for steel didn't nosedive when makers of household equipment and appliances hit a business recession is shown clearly in this chart. As producers of appliances, utensils and cutlery began last August to ease off their demand for steel the automotive industry, largest consumer of steel, took up not only that slack but much of the additional tonnage available through increased steel production. Comparisons with the next three largest consumers are shown. Further reason the decline in demand from appliance makers made only a slight dent in the overall requirements for steel is the fact those consumers use only 3 per cent of all steel produced, compared with the automotive industry's 15 per cent

consumer of finished steel, received more steel percentagewise and tonnagewise in March than in February, a report released by the American Iron & Steel Institute shows.

The automotive group's receipts in March were 1,085,641 net tons, or 17.2 per cent of the steel industry's shipments of 6,305,681 tons that month. In February, the auto industry was shipped 924,046 tons, or 16.7 per cent of the steel industry's shipments of 5,519,938 tons.

Consumer in second place in receipts of finished steel in March was the construction and maintenance classification, which took 760,235 tons. Rail transportation was in third place with 471,105 tons, the containers classification was fourth with 433,452 tons, and the classification of machinery, industrial equipment and tools was fifth with 311,020 tons.

Jobbers, dealers and distributors received 1,084,821 tons in March, compared with 913,668 tons in February. Exports by mills totaled 318,004 tons in March, an increase over February's 274,045 tons.

Storage Bins To Require Sheets

GALVANIZED sheets 18 gage and lighter will continue in scarce supply over July, August and September as a result of the Commodity Credit Corp. Charter Act amendment under which the government will finance farm installations of grain storage bins with loans up to 85 per cent of the cost.

Storage bin manufacturers who recently met with Agriculture spokesmen to discuss the program now are reporting to Commerce Department their estimated requirements. Not all figures are in, but it is estimated about 28,000 tons of light-weight galvanized sheets monthly will be needed.

Basing Point Bill Moves Ahead

AS EXPECTED, the House Judiciary Committee last week approved the Senate-passed O'Mahoney bill aimed at clearing away the confusion in pricing resulting from adverse Supreme Court decisions in cases involving basing point and similar pricing.

The O'Mahoney bill, which amends the Federal Trade Commission Act and the Clayton Anti-Trust Act, is not the complete answer to industry's pricing problem, but it is viewed as a step in the right direction.

The bill sanctions identical delivered prices at different delivery points provided such do not substantially lessen competition and are not arrived at through collusion. It permits freight absorption, and businessmen can quote different prices to different customers by showing such is done in good faith to meet equally low prices of a competitor. The bill also requires the federal government to back up its anti-trust charges by showing a reasonable probability that the pricing action attacked lessens competition.

When the House will act on the measure is uncertain. However, efforts are being made to obtain prompt consideration. The bill, as approved by the House Judiciary Committee incorporating changes in the measure as originally passed by the Senate, is understood to have the support of the Department of Justice and is said to be favored by some staff members of the Federal Trade Commission and the President's Council of Economic Advisers.

Extent the O'Mahoney bill, if passed, will restore basing point pricing in the steel industry is uncertain. Indications are current high freight rates make full return to former basing point pricing prohibitive. On the other hand, with competition for business increasing, expectations are steelmakers will resort to freight absorption whenever and wherever such is desirable and feasible.

FRIENDLY START: Even though Philip Murray (left), president, United Steelworkers, and John A. Stephens, vice president of industrial relations, U. S. Steel Corp., may get into heated debate in their current collective bargaining conference, they started with a friendly handshake. NEA photo

Wage Parleys Under Way

Steel and metalworking industries resist union demands in early stages of negotiations

RESISTANCE to big labor's wage and pension demands continued last week in the early stages of negotiations in several industries.

United Steelworkers of America last week in negotiations with U. S. Steel subsidiaries continued to press for pensions as well as wages and insurance; the Ford Motor Co. rejected the United Automobile Worker's pension and wage demands; and there were indications Westinghouse Electric Corp. would duplicate General Electric Co.'s refusal to grant the United Electrical Workers a $500 year increase in wages, insurance etc.

Miners Return — Meanwhile, the United Mine Workers ended their one-week "stabilization" work stoppage. They were to work five days and then take their annual ten-day vacation. Present agreements between the UMW and the mine operators expire June 30. If no new contract settlements are reached, the union's traditional "no contract, no work" policy will keep the miners away from the pits. It was believed the northern and western mine operators were incined to make terms with the UMW before the southern operators, whose negotiations appeared to be drifting toward a deadlock.

There was speculation last week that if a steel strike were to develop out of industry refusal to discuss pensions this year the United Steelworkers might seek government help in collecting full pay for the work time lost by its members on strike. The union, it was said, might file charges of unfair labor practice with the National Labor Relations Board, the action having the double purpose of forcing the steel producers to bargain and of laying the base for a court order to obtain back wages if the board upholds the union's position. The union, it was pointed out, might be stopped from legal action if the producers agreed to bargain on pensions but refused to make any pension concessions.

Not in Contract—U. S. Steel Corp., pattern-setter in the steel industry, has stated that its steelworkers labor contracts, which do not expire until Apr., 30, 1950, can be reopened now only "with respect to rates of pay and insurance benefits." By the terms of the contracts they cannot be reopened to permit the union to make a pension demand, the corporation declared.

On the other hand, the union con-

tends the contract does not expressly prohibit the reopening of negotiations on the subject of pensions, and that if pensions, therefore, fall within the scope of one of the items expressly stated as subjects for reopening of negotiations, pensions must also be considered a proper subject for the reopening. The union further contends pensions are a form of wages.

The Ford Motor Co. in rejecting the UAW demands, counterproposed an 18-month extension of current wage rates (see page 43).

Factory Jobs Decrease Again

FACTORY JOBS decreased in May for the eighth consecutive month, the drop estimated at 320,000. Some of this, the Bureau of Labor Statistics said, is traceable to strikes, particularly the one at Ford Motor Co.

Manufacturing employment in May was about 1,700,000 below the postwar peak of last September and about 900,000 below the May, 1948, figure.

Schedule Minimum Wage Hearing

HEARING to consider amendment of the 50 cents an hour minimum for employment in the aircraft manufacturing industry on government contracts let under the Walsh-Healey act is scheduled for July 26.

According to an earnings survey conducted by the Bureau of Labor Statistics in November, 1948, less than 0.5 per cent of the approximately 165,000 workers covered were receiving less than 95 cents an hour.

Postwar Power Program at Peak

Masterful production planning of equipment suppliers reflected in progress on $9 billion expansion undertaken by privately-owned electric utilities. Completion seen in 1951

THE six-year, $9 billion postwar electric power expansion program reaches its peak at midyear. This program, started after wartime bans on use of materials and labor were lifted, will be virtually complete some time in 1951, and will add 21 million kilowatts to power production capacity, a 52 per cent increase in privately owned capacity since end of the war.

New power plants, transmission and distribution systems, with internal equipment, are currently going up at a rate of over $5 million daily. Over $2 billion will be paid out this year, some 7 million kw additional capacity being added before 1949 ends.

For the first four months of 1949 cumulative capacity of generating units shipped and scheduled totaled 1,839,100 kw to May 1. For the last eight months this year equipment with capacity of 4,440,500 kw will be shipped. This covers utilities in continental U. S. only.

About 18 months ago the domestic expansion program ran into an ambitious plan for restoring war-damaged power facilities in Europe. When the size of this project became known it threw a scare into many suppliers of steel and power equipment who feared diversion of supplies to Europe would further delay the domestic program.

However, through masterful production planning and timing, the steel and equipment manufacturers have been able to meet the test, scheduling needs for the domestic program in such way as to meet ECA demands. The expected squeeze never developed.

Open Capacity—Beginning with third quarter, 1951, it appears there will be open production capacity for steam generating equipment, and for the entire last half of the year, open capacity for steam generators, water wheels (hydro) and other installations from which remaining European needs can be met. Also, European equipment builders have recovered much quicker than expected and are in position to care for considerable European requirements. However, France needs high silicon steels for power transformers, and while Italy can make hydro equipment, it will need steel, probably from the U. S.

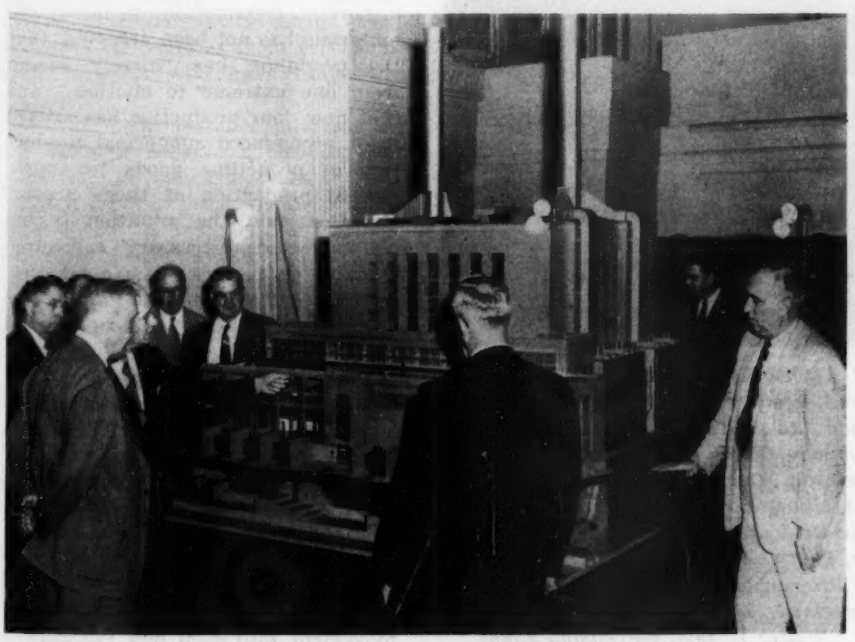
Between 1947 and 1951 for American companies alone more than 21 million kw of new industrial and home capacity will have been added. This relates solely to facilities owned by private systems, exclusive of the expanding government program.

About 80 per cent of that capacity will be privately owned and 20 per cent government operated or nonfederal, presumably co-operatives. There also is about 13 million kw in industrial plants, transportation systems and others.

Largest Coal User—In source of energy, about 72 per cent uses energy derived from coal or other solid fuels, gas, or liquid fuel; about 28 per cent represents hydraulic energy. The electric industry is the largest consumer of coal.

Cost of the various items entering the 6-year power expansion program has risen from 50 to 200 per cent. Cost of building a steam electric plant has gone up as much as 75 per cent per kilowatt.

Industry opinion differs as to the needed margin of power capacity reserve. However, Walter L. Cisler, executive vice president, Detroit Edison Co., and a recognized authority, believes about 15 per cent is sufficient for average conditions.



In model form is a plant Pennsylvania Power & Light Co. is constructing in Sunbury, Pa., the plant being one of numerous projects comprising a $9 billion postwar expansion program of privately owned utilities companies

Buyers Expect Steel Price Cut

Reductions anticipated with product supply shortages rapidly fading, Steel Committee reports to National Association of Purchasing Agents meeting in Chicago

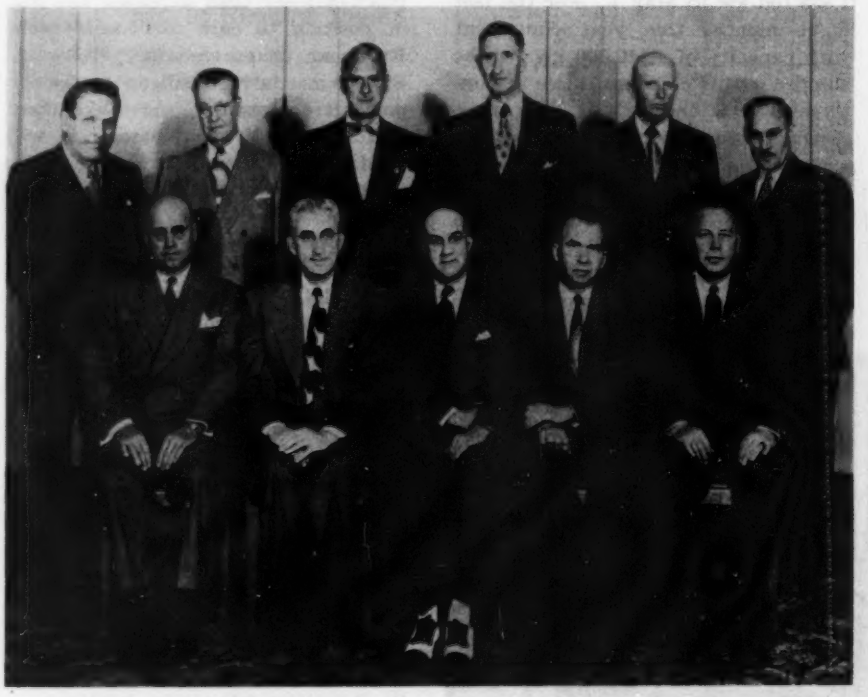
STEEL prices are due for a decline and all types of steel products will be plentiful in 30 to 60 days.

This was the opinion of industrial purchasing agents expressed in a Steel Committee report presented last week at the 34th annual convention of the National Association of Purchasing Agents in Chicago, a meeting at which the matter of prices replaced supplies as the major subject for discussion.

In the formal sessions, in the corridors and at the concurrent "Inform-a-Show," the return to a buyers' market in virtually all products was evident.

Reports on Steel—Fred G. Syburg, chairman, NAPA Committee on Steel, and purchasing agent, Chain Belt Co., Milwaukee, reported that of 25 members of his committee only two believe steel prices are not due for a drop. Transformation of the steel demand-supply picture from scarcity to plenty has been marked the last 60 days, he said, and in all localities there is an adequate amount of most types of steel. All types will be plentiful in 30 to 60 days, he predicted.

Today, stocks in the New England territory amount to about five or six months' supply, mid-Atlantic three months, Midwest three months, and Inner Mountain to two months. Ninety days hence the picture will have changed in New England to two to three months' supply on hand, in the mid-Atlantic region to two months. It will remain about constant in the other two regions. There seems to be no disposition to stock steel against the possibility of strikes in the steel and coal industries.



Executive committee of the National Association of Purchasing Agents for the 1949-50 term is pictured. Seated, left to right, are: T. H. Ainlay, B. F. Goodrich Rubber Co. of Canada Ltd., Kitchener, Ont.; NAPA's past president, Ralph O. Keefer, Aluminum Co. of America, Pittsburgh; NAPA's new president, T. A. Corcoran, Courier-Journal—Louisville Times, Louisville; Laurie C. Wakefield, Minnesota Paints Inc., Ft. Wayne, Ind.; and H. F. Jones, E. I. du Pont de Nemours & Co., Wilmington, Del. Standing, left to right: R. N. Patrick, Plantation Pipe Line Co., Atlanta; William H. Hunt, Nicholson File Co., Providence, R. I.; Thomas D. Hudson, American Steel & Wire Co., Cleveland; Walter N. McPhee, Kelly, Douglas & Co. Ltd., Vancouver, B. C.; Walter L. Bell, purchasing agent of Tarrant county, Ft. Worth, Tex.; and Arthur G. Pearson, American Meat Institute, Chicago. All except Mr. Keefer and Mr. Corcoran are district vice presidents of NAPA. George A. Renard, not pictured, continues as secretary-treasurer

Cites Factors—In explaining the purchasing men's belief that price declines are indicated, he cited these factors: 1. Drop in scrap costs; 2. the most efficient producers are now setting the market; premium price material is no longer in good demand; 3. the bottom has fallen out of the secondary products market; and 4. feeling exists that price cuts can maintain volume. His report discounted the rigidity of wage rates.

Nelson J. Gibbons, Motor Wheel Corp., Lansing, Mich., said the most significant development in steel demand around Detroit is that car builders are asking for faster delivery but are not increasing the size of orders.

Encourage Expansion — Virgil D. Waters, Utility Trailer Mfg. Co., Los Angeles, expressed the view continuation of f.o.b. selling methods would encourage West Coast producers to expand their output into more products. Production on the Coast is still less than consumption.

Ernest H. Hawkins, acting chief, Office of Materials Resources, Munitions Board, told the purchasers that the $3.5 billion postwar government stockpiling program is about one-third completed when materials on hand and on order are considered.

Return to Normal—Effects of the return of normalcy in the marketplace were outlined by Charles R. Cox, president, Carnegie-Illinois Steel Corp. Citing how from V-J Day on a normal distribution of labor and materials has not been achieved, that the pendulum has "merely swung from one extreme to another," and that now "our production has shifted from pronounced subnormal production of peacetime goods to supranormal production of those goods," Mr. Cox said the situation is being corrected. Necessary corrective steps as order backlogs are exhausted, he asserted, are that "manpower and resources thereby released should be shifted from the production of backlog goods into the production of new goods, and into more general enlargement of the production of all the segments of our economic life."

To bring forth this new demand requires these elements: "First, invention and enterprise in establishing new products, new services, new companies and industries; second, it calls for savings and their free movement into such new enterprises in the hope of a profit; and third, it calls for mobility of labor as between employers, industries, and perhaps, occupations."

Curtailing Steel Stocks

Fastener makers bringing inventories into line with slower demand. Few layoffs noted

FASTENER industry is going through a period of adjustment reflected in inventories being brought in line with demand. Some bolt and nut, rivet and screw manufacturers have been living off steel inventories the past several months. Others have been deliberately curtailing stocks of steel because of easier supply conditions. Steel shipments, slow a year ago, now are received from two days to two months after placement of orders.

Slightly more than half the manufacturers queried by STEEL in a spot survey have larger inventories of steel than they had at the first of the year. Relatively large stocks are attributed by some to a decline in sales beginning a little over a year ago.

Producers of fasteners recognize that war-created backlogs, exhausted or rapidly being filled, presage a return to peacetime inventories and production.

Appliance Slump—Biggest dip in sales has come from appliance manufacturers. Demand from auto builders and agricultural implement manufacturers has held up well. Jobbers are bringing their inventories to prewar levels rapidly. Bolts and nuts, screws and rivets for aircraft have held up or are increasing because of the defense program. Radio manufacturing requirements have been bolstered by business from television manufacturers who have taken up the slack.

A few small fastener interests in the Midwest observe a business decline only in standard items.

Some signs of price weakness have been noted on fasteners of various types in recent weeks, but in the main published quotations have been holding insofar as the larger and well-established manufacturers are concerned. Some softening in the market has been reported at New York and Cleveland. This, however, seems to have been confined to shading of quotations to jobbers and auto builders in a few instances. In general, bolt and nut, rivet and screw producers report prices stable, maintaining reductions are unjustified in the face of high wage rates and continued rising production costs.

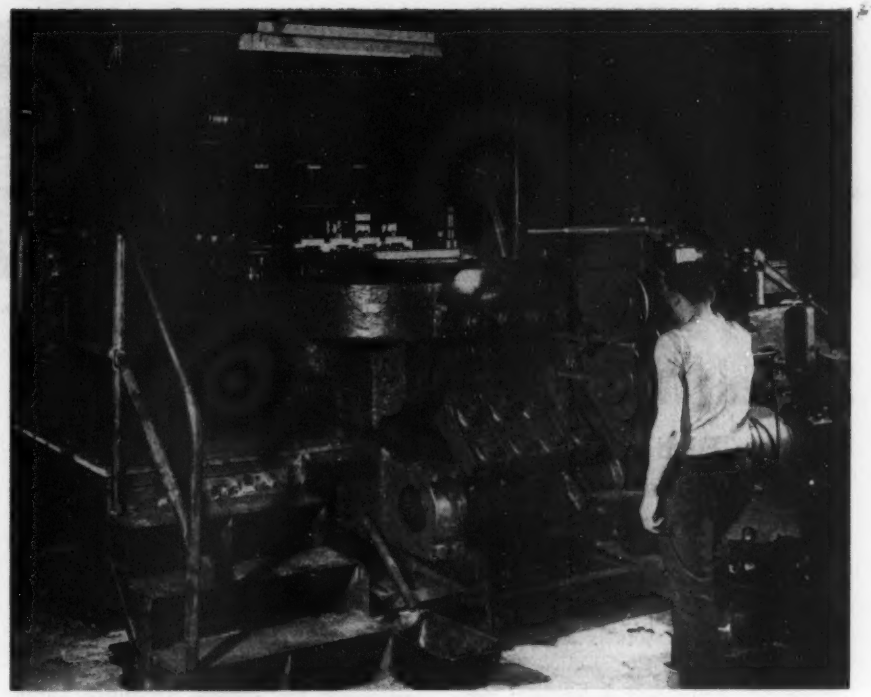
Absorb Freight — Some fastener manufacturers are absorbing freight in meeting competition. One Cleveland manufacturer, also, has been shading prices up to 10 per cent since last fall. This interest's prices are still above those it quoted prewar. Another company, "squeezing the water out" by checking costs closely and through efficiency, is reported to have reduced prices 20 per cent. Another firm has effected a 5 per cent reduction, reflecting lower steel costs.

Bolt and nut prices are reported steadier than those on cap screws, but the general tendency in the industry as a whole is to meet "legitimate" competition whenever and wherever it is encountered.

Few Layoffs—Layoffs in the industry have been few. Cutbacks of from 5 to 20 per cent in production have largely taken the form of furloughs, fewer hours worked per day, elimination or diminishing of the work force on certain shifts and fewer days worked per week. One small firm which lowered its work week from 45 hours in February to 35 hours this summer is tending toward a 32-hour week.

Most fastener producers queried by STEEL deny that steel companies have made them any price concessions, though several said they are paying less for steel today largely because of the disappearance of premium prices. Some manufacturing companies with large inventories were said to be willing to sell steel below mill prices in order to move excess stocks. Most fastener makers do not expect any drop in mill prices on steel bar and rod until after present steel wage negotiations. The sharp reduction in scrap prices resulting in smaller income on scrap returned to the mills without an accompanying reduction in steel prices has resulted in higher bar stock cost to the fastener makers.

Consensus on the O'Mahoney bill, now in the House, is that freight absorption in the absence of collusion is the only fair way of doing business under a competitive system. Some companies in the industry never abandoned basing point pricing. One company put it this way: "We reserve the option to meet legitimate competition." Another felt the basing point method allowed the company to figure other costs as closely as it figured labor costs. Some companies prefer that their customers pay the freight.

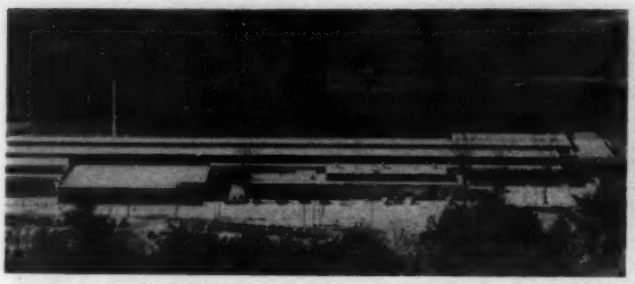


To help supply the demand for fasteners, this nut forming machine transforms rods into hexagonal nuts at a rapid rate at Republic Steel Corp.'s Bolt & Nut Division, Cleveland. The machine weighs almost 80 tons

GROUP CHANGES NAME

AMERICAN Institute of Bolt, Nut & Rivet Manufacturers has changed its name to Industrial Fasteners Institute. The new name will be effective July 1, according to Herman H. Lind, president.

Length of the previous name and need for a more generic name were cited by Mr. Lind as reasons for the change. The institute was formed in 1931.



Bryant Chucking Grinder Co., Springfield, Vt.

Cone Automatic Machine Co. Inc., Windsor, Vt.

Special Machine Tool Show Held

Four builders in Sprinfield-Windsor, Vt., area jointly stage in-plant exhibitions and demonstrations of new models. Displays impress the more than 500 industrialists attending

SUCCESS of the regional machine tool exhibition and demonstration staged last week jointly by Bryant Chucking Grinder Co., Fellows Gear Shaper Co. and Jones & Lamson Machine Co. of Springfield, and Cone Automatic Machine Co. Inc. of Windsor, Vt., aroused much comment on the part of more than 500 industrialists who accepted the invitation to attend extended by this group of Vermont machine tool builders.

Many of the visitors remarked this "in-plant" showing of new model machine tools may be a very effective answer to the problem of how to get builders and users together for study of, and solution of, economic and engineering questions involved in the many production changes now sweeping through industry with the return to the buyers' market.

The consensus is a number of similar regional machine tool showings are likely to be staged between now and the time when the industry again feels able to put on a national show of the caliber of that held in Chicago in the fall of 1947.

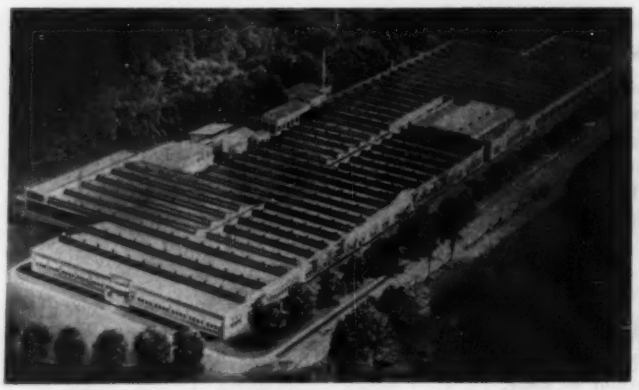
Reflect Changes—In the 120 years during which machine tools have been built in the Springfield-Windsor region, the output of the area shops has been quick to reflect changes in manufacturing techniques. Developed originally for the interchangeable manufacture of pumps, firearms, and sewing machines, these companies in the beginning manufactured a wide variety of machines—many of them special. For example, contracts were taken for complete tooling of government armories—notably that at Enfield, England, in the 1850s.

Then there was a swing toward standardization which at one time in the early 1900s led Jones & Lamson to concentrate on one size of one type of turret lathe. That policy was in part responsible for the rise of the other companies in the area in other and noncompeting lines. Thus Bryant has majored in internal grinders, Fellows in gear shapers and Cone in multiple spindle automatics for bar and chucking work. The noncompetitive nature of these companies has given many benefits to the region, including overall diversification and good intercompany relations. The current show was made practical and possible by these conditions.

Broadening Services—The general impression given by the show is that while keeping within the broad limits just mentioned, all these Vermont companies are broadening their services to industry by departing from the rigid pattern of standardized machines and standardized tooling. Several of the machines obviously have been designed or redesigned with existing and new needs of the automobile, electrical and antifriction bearing industries in mind. Special attention has been given to getting maximum benefit out of carbide tools and out of the latest abrasive wheels. The automatics have been modified so that quick and economical changeovers can be made, permitting profitable use on comparatively shortrun work.

In the realm of carbides, speeds up to 1200 surface feet per minute were demonstrated on forged bevel gears. Guards which open automatically and power loading against blade drivers cut down idle time so that stem pinions can be turned out in 17 seconds under production conditions. In the Jones & Lamson exhibit, emphasis also was put on multirib production grinding of threads from the solid. Once an exponent of single point tool threading, Jones & Lamson eventually got into the promotion of opening chaser die heads. Now they are pushing thread grinding.

Features New Machine — Fellows Gear Shaper Co., among 18 items exhibited, featured a new machine for rapid shaving of gears with a modified gear shaper cutter. Unlike conven-



Jones & Lamson Machine Co., Springfield, Vt.

Fellows Gear Shaper Co., Springfield, Vt.

tional shaving, this new system is capable of removing a considerable amount of metal in correcting the tooth form and perfecting the finish.

Bryant exhibited an extraordinary size range of grinders, the smallest, operating on 7 millimeter bores in fuel injection nozzles, employing needle-like wheels running at 90,000 revolutions per minute. This and several other machines have high-cycle spindles. The larger machine was operating on the large bores of connecting rods. One of the machines, using a coarse grained wheel, produced mirror finish on ring gages.

Emphasis in the Cone Automatic exhibit was on low cost tooling, variable camming, and quick changeover facilities for making the advantages of automatics available on small as well as large lots. Generally thought of primarily as a builder of eight spindle machines for big work, Cone now is extending into the field of singles.

One of the new machines unveiled at the show is a single spindle bar machine with unique electronic drive and control. This is capable of multiple carbide tooling on long shaft work. Automatic loaders and conveyor-type chip removers were featured on the Cone machines.

Among those active in the promotion of this Springfield-Windsor show were— K. H. Woolson, president, and J. C. Herbert, general sales manager, Jones & Lamson Machine Co.; H. P. Chaplin, treasurer and general manager, Cone Automatic Machine Co.; E. W. Miller, president, Fellows Gear Shaper Co.; and W. J. Bryant, president, and Hartness Beardsley, general manager, Bryant Chucking Grinder Co. They had as special guests a number of other leading machine tool builders, Army and Navy officers, and government officials.

Machine Tools Stabilizing

MACHINE tool industry has leveled out after a long downtrend, with production steady about 10 per cent below the 1948 average and orders to date this year substantially above those in last quarter of 1948, L. D. McDonald, president, National Machine Tool Builders' Association, and vice president, Warner & Swasey Co., Cleveland, said last week.

First quarter shipments reflected the low order volume of the last quarter of 1948, he said, but with the turn of the year orders began to increase.

Mr. McDonald is of the opinion volume for the first half of this year will average higher than for the last quarter of 1948 despite declining industrial activity.

The association's index of new orders for machine tools declined again in May to 63.7 from 70.1 in April. Bulk of the decline came in foreign orders which were at an index figure of 15.9 in the latest month, compared with 23.1 a month earlier. Shipments were also off slightly to 72.8 in May from 74.7 in April. The ratio of unfilled orders to shipments remained unchanged at 4.4 to 1.

Expansions Hold in Northern Ohio

CLEVELAND Electric Illuminating Co. has seen no lag in long-term industrial expansion and is increasing its development program for northeastern Ohio despite the business decline.

Falling construction costs which are reactivating many deferred building plans and heavier competition from other areas are cited as major causes behind the livelier activity in the electric company's "best location in the nation" program. Principal limiting factor in the campaign is the more cautious attitude toward expansion now taken by small firms.

One of the largest jobs under construction in the region served by Cleveland Electric Illuminating is a $10 million sodium and chlorine plant in Ashtabula, O., being built by National Distillers Chemical Corp., subsidiary of National Distillers Products Corp. Substantially all the chlorine production from this facility will be supplied in the form of gas via pipeline to another new plant, a $2 million unit also in Ashtabula, being erected for Hooker-Detrex Inc. to manufacture trichloroethylene, a metal cleaning and oil extraction solvent. Both projects will probably be in production by April, 1950.

Structural Steel Takes Up Slack

HEAVY backlogs for structural steel fabricating are taking up much of the slack in declining business, American and Canadian engineers heard at the annual engineering conference of the American Institute of Steel Construction last week.

L. Abbett Post, executive vice president, summing up district engineers reports, said construction of public and semipublic buildings is now moving at an accelerated rate, but commercial and industrial building is experiencing a letup. He said large-scale housing developments are holding their own, and designers of buildings using structural steel are busy.

Pointing out construction or orders for over 2000 steel bridges, he also predicted year's end would see seating capacity of steel sport stadiums increased by 1 million since the end of the war.

Horse Trades Fade as Steel Eases

END of the steel shortage has brought a halt to a horse-trading method of getting the vital raw material practiced for about two years by Lyon Metal Products Inc., Aurora, Ill., manufacturer of shelving, lockers, cabinets and many other related products.

When the steel shortage threatened to throttle Lyon's production, the horse-trading technique was adopted as a desperation measure. Lyon promised to buy steel from customers and ship the pound-for-pound equivalent in either standard Lyon products at regular published prices or special items made to customer specifications.

About 45 million pounds of customer furnished steel was secured during the entire drive, boosting total Lyon shipments by 31.5 per cent in 1947 and 29.7 per cent in 1948. Customer-furnished steel accounted for 54 per cent of the Lyon net profit dollars in 1947, 52 per cent in 1948.

Steel Price Cut Held Unlikely

DECLINING production is raising steel costs by making it necessary to spread fixed overhead charges over a smaller number of tons. This is the opinion of Frank Purnell, president of the Youngstown Sheet & Tube Co., Youngstown.

Blasting hopes of steel consumers now reducing inventories and individuals holding off buying autos and refrigerators with expectation of lower steel prices, he said such cuts under present conditions are not warranted.

Issues Steelmaking Book

UNITED STATES Steel Corp. has published a 100-page book, *Steel Making in America,* which describes the manufacture of steel in the United States from raw materials through finished steel products ready for shipment from the mills. A brief history of the iron and steel industry from earliest times to the present is also included.

The book was prepared primarily for school students in response to thousands of requests received from pupils for information about steelmaking, but it also is designed to help adult laymen interested in learning more about steel.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

First step taken in reorganizing executive branch of national government. Passage of bill by Congress indicates Hoover Commission did not labor in vain

PASSAGE by Congress of the Reorganization Act of 1949 is the first proof that the Hoover Commission on Organization of the Executive Branch of the Government did not labor in vain. It is the first step in reorganizing the executive branch of our government which, in the words of one of the House conferees, Rep. Harold O. Lovre (Rep., S. Dak.), "has grown to such a point that it has developed into a sprawling, wasteful and inefficient bureaucracy which nobody understands and which is gradually sapping our economic strength."

As the bill came out of the two houses of Congress there were two major disagreements. The House bill required action by both houses to nullify the President's reorganization proposals, whereas the Senate provided such proposals could be killed by the action of either branch of Congress. In the final act the Senate prevailed. The other, and vital, disagreement concerned exemption of certain pet agencies of Congress. The House voted for such exemptions whereas the Senate version provided against such restrictions on the President. On this important issue the Senate again prevailed.

No Exceptions—So in the final bill that went to the White House there are no exceptions to the general rule that all agencies are subject to reorganization. There is no chance for any one agency to appear before Congress and say, "Yes, I believe in reorganization, but reorganize the other fellow and not me." Only those who are acquainted with the powerful lobbies which many of the agencies maintain can appreciate the importance of this feature. With 1800 odd agencies and bureaus that are covered by the act, any such loophole would threaten the entire program.

Now the reorganization job is up to the President who quickly sent several reorganization plans to Congress in line with recommendations of the now defunct Hoover commission.

In the meantime, Congress is working on other legislation suggested by the Hoover commission—the principal bills under this heading providing for centralization of all of the government's nonmilitary procurement and for tighter integration or unification of the armed forces. There will be others.

From present indications, it is likely that history will accord great credit to the Hoover commission.

RFC Grants Metalworking Loans

SEVERAL loans to metalworking companies have been authorized by Reconstruction Finance Corp. Largest is for $1,283,000 to Southern California Homes Inc., Bell, Calif., for one year, to be used as working capital in the production of aluminum prefabricated homes.

Another is for $1,100,000, for one year, to Engineering & Research Corp., Hyattsville, Md., manufacturer of aircraft parts.

Another is for $1 million, for seven years, to Waldes Koh-i-Noor Inc., New York, for manufacture of metal slide fasteners.

Another is to York-Shipley Inc., York, Pa., manufacturer of residential and industrial oil heating equipment, for $650,000, for five years.

Still another is to National Steel Construction Co., Seattle, for $500,000, for seven years, for manufacture of electric and gas hot water heaters.

A further loan of $6 million, for ten years, has been authorized to Carthage Hydrocol Inc., New York, making a total of $18,500,000 advanced by RFC toward this company's $40 million expansion program for conversion of natural gas into premium gasoline and other products.

Another interesting new RFC loan calls for $2,434,000, for six months, to East Tennessee Natural Gas Co., Chattanooga, Tenn., for construction of a gas pipeline.

Marshall Plan Aid Reflected

GOOD example of the business that accrues to United States manufacturers under the Marshall Plan is afforded by the record of procurement for rehabilitation of the Erzberg iron ore field in Austria.

This historic deposit was worked as far back as Roman times and in the Middle Ages became the basis of the Syrian iron industry, famous throughout Europe.

Production, as a result of removal of all serviceable equipment by the Russians, was only 980,000 tons of iron ore in 1948 as compared to the average prewar output of 2 million tons.

United States companies sharing in this business, and the value of their orders on the basis of f. a. s. prices at Atlantic ports are:

Dorr Co. $80,953 for thickeners and parts; Westinghouse Electric Corp. and General Electric Co. $339,835 for electric locomotives; Harnischfeger Corp. and Bucyrus-Erie Co. $769,882 for electric shovels; Joy Mfg. Co. for scrapers and rock drilling equipment; R. G. LeTourneau Inc. $58,700 for track implements; Dings Magnetic Separator Co., Magnetic Engineering & Mfg. Co., Western Machinery Co. and American Cyanamid Co. $28,700 for testing equipment; Nordberg Mfg. Co. $39,100 for track machines; Wm. Bros Boiler & Mfg. Co. $40,000 for snow plows; Worthington Pump & Machinery Corp. and Clark Bros. Co. Inc. $139,362 for compressors; Giddings & Lewis $39,170 for horizontal drilling and milling machine; Allis-Chalmers Mfg. Co. $128,524 for crusher; Niles Tool Corp. $92,248 for center lathe; Rockford Machine Tool Co. $15,716 for two shapers; Bear Mfg. Co. $9990 for dynamic ram; Brown Sites Co. Inc. $43,245 for locomotive crane.

New Metallurgical Techniques

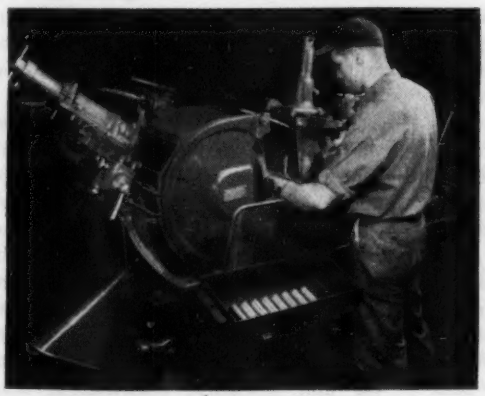
TWO important new metallurgical techniques have been developed as a result of studies under the basic research program of the Office of Naval Research, STEEL is informed by Irvin R. Kramer, ONR's chief metallurgist. Both resulted from work at the Massachusetts Institute of Technology. Detailed reports have not yet been prepared. When they are ready publicity will be given them.

By one technique, developed under Drs. John Chipman and Denis Carney, accurate determination of the hydrogen content of steel may be made in about 15 minutes—that is, a sample from the molten heat may be analyzed for hydrogen in approximately the same time required for the carbon, manganese, silicon, phosphorus and sulphur determinations. With this new method, it will be possible to make much faster progress in studying the quantitative effect of hydrogen on the mechanical properties of steel.

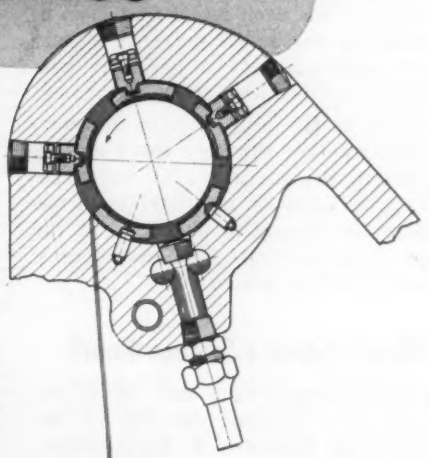
Another new technique, worked out under Drs. Morris Cohen and

NOT A CENT FOR MAINTENANCE required by more than 99% of FILMATIC SPINDLE BEARINGS

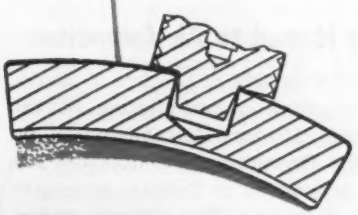
History is dull enough, but here's a historical fact that can mean a brighter future for machine shops everywhere Over ten years ago CINCINNATI Grinders were equipped with FILMATIC Grinding Wheel Spindle Bearings. Many improvements have been made in the machines, but the feature which has given the greatest benefit—FILMATIC—has been retained. During these long hard years, over 99% of all FILMATIC bearings—thousands of them—never have required time off for any reason whatever ¶ In addition to their dependable performance, you don't have to pamper FILMATIC bearings. CINCINNATI FILMATIC Grinding Machines take quick roughing or high-quality finish cuts without adjusting the bearings. Spark-out is quicker. No "pecking" of the diamond while truing. ¶ FILMATIC'S perpetual youth, found only in CINCINNATI Grinding Machines, can save time and money in your shop. Specify a CINCINNATI FILMATIC for your next precision grinder. To obtain brief descriptions, write for general catalog M-1646.



A production veteran, this CINCINNATI FILMATIC Centerless has been in continuous operation since 1937 with no down time charged against the FILMATIC Grinding Wheel Spindle Bearings.



These two drawings illustrate the FILMATIC principle. The spindle drive motor cannot start until the bearing compartment is full of clean, filtered oil. **No chance for wear.** During rotation, high pressure oil wedges support and automatically centralize the spindle—**no adjustment required.** Write for publication G-578.



All Cincinnati Grinding Machines and Cincinnati Centerless Lapping Machines are equipped with Filmatic Grinding Wheel Spindle Bearings

CINCINNATI

CINCINNATI GRINDERS INCORPORATED

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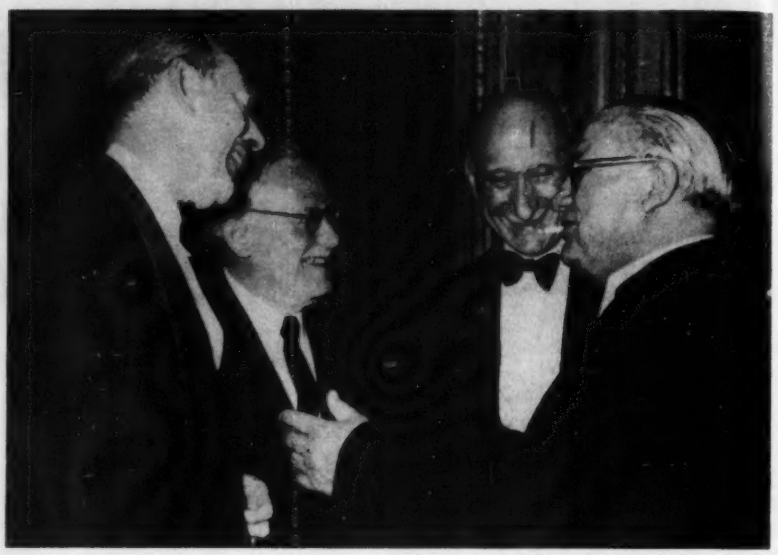
CENTER TYPE GRINDING MACHINES • CENTERLESS LAPPING MACHINES • CENTERLESS GRINDING MACHINES

Benjamin Averbach, involves the use of x-rays for detecting very small amounts of retained austenite in quenched steels, thus facilitating the study of embrittlement resulting from decomposed austenite.

This study is especially concerned with high-carbon high-strength steels where the tempering treatment is carried out at relatively low temperatures insufficiently high to cause decomposition of the austenite.

Employing the new x-ray technique, it has been found that even in steels as low as 0.1 per cent in carbon approximately 4 per cent austenite is retained after quenching.

One of the objectives is to determine whether the very rapid cooling rate in certain areas of welds results in retention of austenite in undesirable quantities and thus, in the event the austenite later decomposes, causes brittle welds.



EVERYBODY HAPPY? In contrast to the quarrelsome atmosphere in which these international figures are frequently found, jollity prevailed, as this photo testifies, at a party honoring foreign ministers who have been meeting at Paris. Left to right are: Dean Acheson, U. S. Secretary of State; Andrei Y. Vishinsky, Russia's foreign minister; Robert Schuman, French foreign minister; and Ernest Bevin, British foreign secretary. NEA photo

What's State's Science Role?

STATE Department has asked Dr. Karl T. Compton, director of the Office of Research & Development, National Military Establishment, to advise on what State's role should be in the field of science. To what extent should State observe and report on scientific progress abroad? To what extent should it encourage scientific research in foreign countries? Should its interest be focused on pure science or on applied science, or both? These are some of the questions to which State wants answers.

Early Named to Air Committee

APPOINTMENT of Stephen T. Early, as the single representative of the National Military Establishment on the Air Coordinating Committee has been announced by Defense Secretary Louis Johnson. The defense undersecretary will represent not only the Navy and the Air Force, which previously held separate memberships, but also the Army and all other NME staff agencies.

Primary function of the committee is to examine problems relating to more than one of the participating agencies and to develop and recommend integrated policies. It deals with such problems as mobilization planning affecting the aircraft manufacturing and air transportation industries and with a large number of problems in the field of international civil aviation. Present membership, in addition to Mr. Early, consists of representatives of Departments of State, Commerce, Post Office, Treasury and of the Civil Aeronautics Board.

Government Appointments

LOUIS J. Paradiso has rejoined the Commerce Department as chief statistician to the Commerce Department's Office of Business Economics, his assignment being the improvement of statistical information for the use of business. Mr. Paradiso is well known for the statistical work he did for Commerce during a previous connection from 1940 to 1947. During the last two years he has been vice president of Econometric Institute Inc.

R. W. Cook has been appointed acting manager of the Atomic Energy Commission's Oak Ridge operations, succeeding John C. Franklin, resigned. He previously had served as deputy manager at Oak Ridge.

Carroll Fentress is the new acting director of the Interior Department's Oil & Gas Division, succeeding Robert E. Friedman who had been acting director since the resignation of Max W. Ball on Dec. 1, 1948.

Washington Notes

SENATE-PASSED proposal to authorize the Reconstruction Finance Corp. to sell low-grade tin concentrates in order to stimulate tin smelting by private interests has been reported favorably by the House Banking & Currency Committee . . . . Two bills of interest to business have been denied rules by the House Rules Committee and may be dead for this session. One is the National Science Foundation bill. The other is the Mine Incentives bill to subsidize production of strategic and critical minerals and metals . . . . President Truman's nomination of John Carson to fill a vacancy on the Federal Trade Commission has been pigeonholed in the Senate Interstate & Foreign Commerce Committee. Registered as a Republican, Mr. Carson's appointment has been opposed by manufacturers and business interests on the ground that his views are too "liberal" . . . . Action on the proposal to increase the national minimum wage from 40 cents an hour to 75 cents has been deferred by lack of sufficient votes to get it out of the House Labor Committee. This means the bill probably is dead for this session of Congress . . . . Much to their surprise, government officials have received requests for an interchange of technical and scientific information with three Russian satellite countries—Hungary, Rumania and Poland. The Hungarians offer an English-language resume of technical and scientific developments reported in the Hungarian technical journals, and want to exchange it for something comparable from the United States. The Rumanians and Poles have something similar in mind. The proposal is under study.

U. S. To Feed Europe's Steel Growth

American makers of iron and steel production equipment may build $118,208,000 worth for Europe if all programs submitted by ECA nations for 1949-50 are approved

AMERICAN manufacturers of equipment for iron and steel production may build $118,208,000 worth of apparatus for Europe if all programs submitted by ECA-participating nations to Organization for European Economic Cooperation for 1949-50 are approved.

These programs require further screening and co-ordination by OEEC and ECA, but no matter what the final decisions a substantial bulk of the capital equipment will be imported from the United States. The following table covers estimated cost of imported equipment for the 1949-50 iron and steel investment program (unit equals $1000):

Country		Iron ore	Blast furnaces	Crude steel	Semi-finished products	Flat products	Other finished products	Miscel.	Total
Austria	Tot.	500			3,150	12,600	2,400	3,200	21,850
	U.S.	300			3,150	10,500	2,400		16,350
Benelux	Tot.	1,760	955	3,027	5,930	15,110	2,300	3,706	32,788
	U.S.	130	300	1,087	4,690	13,630	1,900	686	22,423
Denmark	Tot.								500
	U.S.								200
France	Tot.	5,450	800	400		22,200	5,000	4,650	38,500
	U.S.	5,000		400		21,300	5,000	2,000	33,700
Greece	Tot.	354							8,970
	U.S.	266							4,970
Italy	Tot.		712	2,470	1,783	7,742	4,555	3,238	20,500
	U.S.		712	1,970	1,783	7,742	3,095	2,198	17,500
Norway	Tot.	410		3,250	1,150		1,050	2,015	7,875
	U.S.								2,900
Portugal	Tot.								400
	U.S.								100
United Kingdom	Tot.		2,500			7,665	5,600	3,035	16,550
	U.S.		2,500			7,665	5,600	3,035	16,550
Sweden	Tot.					2,450		809	3,259
	U.S.					2,450		809	3,259
Turkey	Tot.								835
	U.S.								256
Total	Tot.	8,474	4,967	9,147	12,013	67,767	20,905	20,653	152,027
	U.S.	5,696	3,512	3,457	9,623	63,287	17,995	8,728	118,208

Iceland, Ireland, Switzerland and Bizonia do not plan to make any expenditures abroad.

Total equipment imports for iron and steel production for entire ECA program, 1948-1953, are estimated at $554,446,000, of which apparatus valued at $363,367,000 would come from the United States. Before the Marshall Plan went into effect the following programs were in an advanced planning stage or already under construction and were continued with ECA assistance: An 80-inch continuous strip mill for Steel Co. of Wales; a seamless tube mill for Stewarts & Lloyds in England; a 66-inch continuous strip mill for France; two semicontinuous strip mills for Belgium; an 80-inch semicontinuous strip mill for Italy.

Other major iron and steel production facilities authorized since the beginning of the Marshall Plan to receive ECA funds are: $4.1 million toward the cost of a blooming mill at Linz, Austria, with a capacity of 480,000 tons a year; $3.5 million toward purchase of a continuous billet mill at Donawitz, Austria, and rehabilitation of the Erzberg ore field, Styria, Austria; $690,000 initial payment for one reversing cold mill and one skin pass mill at Bass Indre, France; $49,360,000 toward the cost of a $133,060,000 project at Hayange and Ebange, France, which will consist of a continuous hot strip mill with annual capacity of about 775,000 tons, a cold strip mill with a potential output of 350,000 tons of sheet and tin plate, 84 coke ovens, blast furnaces, new crude steel capacity of 500,000 tons annually and a new blooming mill.

Finished steel production for ECA participating nations is estimated at 41,580,000 net tons for 1949-50, compared with 37,400,000 tons in 1948-49 and 34,980,000 tons for the 1935-1938 annual average. Estimated finished steel output by 1952-53 is 48,730,000 tons.

The following summaries cover major features of the iron and steel investment programs submitted to OEEC, subject to revisions and modifications by that group and ECA:

Austria

AUSTRIAN investment program is devoted largely to the rehabilitation of iron mines and modernization and expansion of rolling mills. The largest project involves installation of a semicontinuous strip and sheet mill at Linz, complete with auxiliary slabbing and cold rolling equipment. A blooming mill has already been approved by ECA and OEEC. Total investments are estimated at $110 million to be spent through 1952-53, of which the import requirements are estimated at $45 million. Imports are largely from the United States and Bizonia, with a small expenditure in Norway for electric furnaces.

Benelux

BENELUX investment program involves modernization and expansion of production facilities in all branches of industry. Heaviest capital requirements will be for new rolling mills.

Total cost of the program is estimated at $380 million. Total foreign exchange requirements through 1952-53 are about $150 million, of which $94 million will be spent in the U.S.

Denmark

DENMARK has a new steelworks under construction, the details of which were not presented to OEEC. The plant has an approximate capacity of about 60,000 tons of ingots a year and will produce plates as a major item. Orders for about $500,000 in equipment have been placed in the U. S.

France

FRENCH program involves all branches of the industry. The major investment is being made in rolling mills.

The total estimated cost of the program from July 1, 1948, is estimated at about $600 million, approximately $150 million of which has been spent or committed to date. Of the total investment, around $117 million represents imported equipment and materials, $100 million of which will be spent in the United States by 1952-53.

Greece

SMALL integrated steelworks with an annual capacity of about 80,000 tons to augment current production capacity of about 25,000 tons yearly is planned for Greece. U.S. builders will supply about $5 million in equipment by 1952-53 for the $22.5 million project.

Italy

ITALIAN program involves reconstruction and modernization of facilities existing in 1942, as well as completion of a prewar and wartime expansion project. Equipment for blast furnaces, rolling mills and blooming mills are the major capital requirements. Estimated cost of the total program is about $250 million, with imports at $70 million. About $60 million of this will come from the U. S., the rest from Bizonia.

Norway

NORWEGIAN program plans rehabilitation of the Sydvaranger iron mine and construction of an electric steel mill at Mo i Rana. Total cost

of the projects through 1951-52 is estimated at $63 million. Imports from the dollar area will total about $18 million.

Sweden

SWEDISH iron and steel investments would be confined largely to small rolling mills. If approved, the total program would cost $130 million by 1952-53, of which $10.2 million would come from the U.S. in the form of capital equipment.

Turkey

TURKEY plans to expand its ingot capacity by about 35,000 tons as of 1953, with a proportional increase in finished steel output. Total cost would be $42 million, with $34 million required for imports. Imports won't start until 1950-51.

United Kingdom

THE $1 billion United Kingdom program is the most extensive in Western Europe. All the imports through 1952-53, about $70 million, will be obtained from the U.S. and involve equipment for every conceivable phase of iron and steel production. The most important single unit in the program is the sheet and tin plate plant of Steel Co. of Wales which requires dollar expenditures of $21.5 million.

List Heads of ECA Missions

FOLLOWING is a list of heads of Economic Cooperation Administration missions to the various participating countries.

Ambassador W. Averell Harriman, U. S. Special Representative in Europe, Hotel Tallyrand, 2 Rue St. Florentin, Paris 1, France; Clyde N. King, chief, ECA Mission to Austria, c/o American Legation, Vienna, Austria; Robert M. Hanes, chief, ECA Mission to Belgium-Luxemburg, c/o American Embassy, Brussels, Belgium; Charles A. Marshall, chief, ECA Mission to Denmark, c/o American Embassy, Copenhagen, Denmark; Barry Bingham, chief, ECA Mission to France, c/o American Embassy, Paris, France; Norman H. Collisson, deputy chief, ECA Mission to the Bizone, c/o U. S. Political Advisor, Frankfurt, APO 757, c/o Postmaster, New York, N. Y.; John Nuveen, Jr., chief, ECA Mission to Greece, c/o American Embassy, Athens, Greece; Richard P. Butrick, acting chief, ECA Mission to Iceland, c/o American Legation, Reykjavik, Iceland; Joseph E. Carrigan, chief, ECA Mission to Ireland, 7 Fitzwilliam Place, Dublin, Ireland.

James D. Zellerbach, chief, ECA Mission to Italy, 62 Via Veneto, Rome, Italy; Clarence E. Hunter, chief, ECA Mission to the Netherlands, c/o American Embassy, The Hague, The Netherlands; John E. Gross, chief, ECA Mission to Norway, c/o American Embassy, Oslo, Norway; David L. Patten, chief, ECA Mission to Portugal, c/o American Embassy, Lisbon, Portugal; Michael S. Harris, chief, ECA Mission to Sweden, c/o American Embassy, Stockholm, Sweden; Robert E. Galloway, chief, ECA Mission to Trieste, c/o U. S. Political Advisor, Free Territory of Trieste; Russell H. Dorr, chief, ECA Mission to Turkey, c/o American Embassy, Ankara, Turkey; Thomas K. Finletter, chief, ECA Mission to the United Kingdom, c/o American Embassy, London, England; Roger D. Lapham, chief, ECA Mission to China, c/o American Consulate General, Canton, China; Arthur C. Bunce, chief, ECA Mission to Korea, APO 235, Unit 2, c/o Postmaster, San Francisco, Calif.

Discuss Nodular Graphite Iron

Report on research project submitted at annual meeting of Malleable Founders' Society. James H. Smith elected new president of organization

WHILE actual research on nodular graphite iron is not sufficiently advanced to present conclusive findings or recommendations on all phases of the subject, encouraging progress is being made, it was reported at the annual meeting of the Malleable Founders' Society at Hot Springs, Va., June 16-17.

The matter is under investigation for the society at the Southern Research Institute, Birmingham, under direction of Dr. W. H. Austin Jr.

James H. Lansing, technical and research director of the society, in a resume of the known established facts concerning production methods and properties of nodular iron, presented a chart comparing the physical properties of nodular, malleable and pearlitic malleable irons. He expressed the belief heavy section parts where forgings or weldments commonly are employed would be among the best potential markets for nodular iron castings.

Scope of Research—Dr. Austin, outlining the scope of the research project, said production details being studied include such factors as magnesium addition methods, inoculants, effecting of holding time, annealing, etc.

Investigation of the use of standard composition malleable iron as the base metal in production of nodular iron indicate difficulties in thin sections—⅛ to ½-inch—owing to the tendency of low carbon equivalent iron to develop free cementite in such sections, Dr. Austin stated.

Commenting on the build-up of residual alloys through reuse of scrap, Dr. Austin indicated this should be no problem with commonly used analyses of either copper-magnesium or nickel-magnesium. With a 70-30 alloy of the former, the maximum build-up would be 1.86 per cent copper, while use of an 80-20 alloy of the latter would result in a maximum nickel content of 3.2 per cent.

JAMES H. SMITH

In presenting the president's annual report, Collins L. Carter, president, Albion Malleable Iron Co., Albion, Mich., detailed some of the requirements that must be met if the industry is to hold and improve its place in a fast changing economy. These latter he listed under the general headings of: Effective organization, planning and cost control, mechanization, quality control and marketing techniques.

Strengthen Sales—Mr. Carter urged the members to strengthen their sales and product engineering efforts and to seek to obtain new business on the basis of quality, performance and cost.

Featuring the annual banquet was presentation of the Charles H. McCrea award medal for 1949 to Anthony Haswell, president, Dayton Malleable Iron Co., Dayton.

New officers elected for the ensuing year are: President, James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich.; vice president, Ralph T. Rycroft Sr., Kencroft Malleable Co. Inc., Buffalo; treasurer, Dudley V. Walker, managing director, Eberhard Mfg. Co., Division of Eastern Malleable Iron Co., Cleveland.

Lowell D. Ryan was re-elected managing director.

The following new directors were elected: Mr. Rycroft; W. Scott Roby, Peoria Malleable Castings Co., Peoria, Ill.; H. P. Blumenauer Sr., Albany Castings Co. Inc., Voorheesville, N. Y.; Arthur F. Jackson, Lake City Malleable Co., Cleveland.

Labor Law Discussed—James H. Smith, newly elected president, presided at the closing session, at which proposed programs for each of the society's ten standing committees for the coming year were presented.

"The Status of Labor Legislation," an unusually detailed discussion of the battle in Congress to repeal or revise the Taft-Hartley Act was pre-

sented by Lee Shaw, Seyfarth, Shaw & Fairweather, Chicago. While outcome of the legislative maneuvers are very much in doubt, Mr. Shaw indicated that if any new law is passed, it will incorporate many of the basic features of the existing act.

Greater Co-operation

Between steel supplier and heat treater urged at spring meeting of Metal Treating Institute

GREATER co-operation between steel supplier and heat treater with adoption of a program for its promotion featured the spring meeting of the Metal Treating Institute at Quebec.

In event of unsatisfactory results in heat treatment of metal parts involving any question as to character of the metal, a resolution was favored to the effect the customer should be notified and heat treater and steel supplier co-operate in an endeavor to determine the cause of the trouble.

This resolution is being transmitted to all steel companies with a request the recommendation be adopted as company policy.

Break-Even Point—Control of break-even point in metal treating shops was also given salient place on the program. General agreement was reached that captive heat treating installations operating at low capacity constitute one of the best opportunities for new heat-treating volume. Using a Metal Treating Institute captive plant report, one Minneapolis heat treater demonstrated to a customer that his cost of 16.00c a pound in his own furnace could be done at 11.00c in the MTI member's plant; at least half of a salesman's effort in this case is now concentrated on captive plants.

Don M. Knoch, New York, presented typical plant cost curves on pack carburizing, liquid carburizing and nitro-gas carburizing to varying case depths in the electric furnace. With Al Ridinger, Minneapolis, he agreed overall cost of heat-treating operations in their shops was lower with electric furnaces, controlled automatically and operated for extended periods without manual attention.

Homogeneous Process—Successful employment of a homogeneous carburizing process promoted by Surface Combustion Corp., Toledo, O., making it possible to carburize carbon sheets throughout depth was reported by Charles Weir, Commonwealth Industries Inc., Detroit. More general use of atmospheres was indicated by discussions and some expressed the opinion all commercial heat treaters should consider using atmospheres to improve service.

A. E. Bowden, metallurgical engineer, Steel Co. of Canada Ltd., reviewed effects of various alloys on physical properties of steel and outlined how heat treaters could benefit by a study of S curves of certain alloy steels.

Robert MacAllister, Syracuse Heat Treating Corp., outlined graphical means of determining break-even points, including methods by which this point might be controlled when too high. Several members reported ability to determine cause of loss or reduction in margin by dividing their shops into departments with separate cost records for each and checking costs monthly or quarterly.

The seventeenth annual meeting will be held at Cleveland, Oct. 14-16.

Pressed Metal Men Meet in July

PROBLEMS and policies in a changing market will be the theme of the Pressed Metal Institute's annual convention at the Hotel Cleveland, Cleveland, July 20-22.

Guests of the convention will be a 16-man stamping productivity team from England. Opening session of the convention will be a conducted tour of Republic Steel Corp.'s sheet and strip mill in Cleveland. A. T. Colwell, vice president, Thompson Products Inc., will discuss jet engines and jet propulsion. Technical sessions will cover training of die engineer personnel; how the metal spinners work with stamping companies; recognizing seniority and job preference in a stamping shop; history of a government job; and rectangular deep draws in aluminum.

Industry-School Co-operation

FIVE steps by which better understanding between industry and the universities can be achieved were outlined to a group of steel executives at Cleveland last week by Arthur S. Flemming, president of Ohio Wesleyan University and former chairman of the Federal Civil Service Commission.

Such understanding, says Dr. Flemming, should pay rich dividends to both the colleges and industry. More intimate knowledge of the objectives of industry, he believes, would dispel many of the socialistic theories emanating from colleges and help sell the American system of enterprise to youth.

Five steps recommended by Dr. Flemming:

1. Setting up by the colleges of advisory committees from industry.

2. Bringing more educators into general labor-management conferences.

3. Sponsoring of field trips and other devices by which students come into contact with industry.

4. Offering by industry of summer vacation employment to instructors.

5. Offering by industry of summer employment to students.

CALENDAR
OF MEETINGS

June 27-28, American Foundrymen's Society: Chapter chairmen's conference, Chicago. Society headquarters are at 222 W. Adams St., Chicago.

June 27-30, American Electroplaters' Society: National convention, Hotel Schroeder, Milwaukee. Society headquarters are at 473 York Rd., Jenkintown, Pa.

June 27-July 1, American Society of Mechanical Engineers: Semiannual meeting, University of California Extension Bldg., San Francisco. Society headquarters are at 29 W. 39th St., New York.

June 27-July 1, American Society for Testing Materials: 52nd annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters are at 1916 Race St., Philadelphia.

July 11-16, Concrete Reinforcing Steel Institute: 25th anniversary meeting, The Greenbrier, White Sulphur Springs, W. Va. Wire Reinforcement Institute will meet July 11; Steel Joist Institute will meet July 12; American Iron & Steel Institute Committee on Reinforced Concrete Research will meet July 13; Rail Steel Bar Association will meet July 13; Concrete Reinforcing Steel Institute will meet July 14-16. Last group's headquarters are at 38 S. Dearborn St., Chicago.

July 13-15, American Society of Civil Engineers: Summer convention, Mexico City. Society headquarters are at 33 W. 39th St., New York.

July 14-15, Magnesium Association: Quarterly meeting, Hotel General Brock, Niagara Falls, Canada. Association headquarters are at 30 Rockefeller Plaza, New York.

July 15-24, South American Union of Engineering Associations: First Pan-American Congress, Rio de Janeiro, Brazil.

July 22, Truck-Trailer Manufacturers Association: Mid-year general meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at 809 National Press Bldg., Washington.

July 28-29, American Foundrymen's Society: Annual directors' meeting, Chicago.

Aug. 10-12, Western Packaging Exposition: Civic Auditorium, San Francisco.

Sept. 9-12, Instrument Society of America: Clinic on maintenance of industrial instruments, Statler Hotel, St. Louis. Society headquarters are at 921 Ridge Ave., Pittsburgh.

Sept. 12-16, Instrument Society of America: National conference and exhibit, Municipal Auditorium, St. Louis. Society headquarters are at 921 Ridge Ave., Pittsburgh.

Sept. 15-16, Magnesium Association: Quarterly meeting, Hotel Statler, Detroit. Association headquarters are at 30 Rockefeller Plaza, New York.

Sept. 21-24, National Association of Foremen: 26th convention, Hotel Statler and Masonic Temple, Detroit. Association headquarters are at 321 W. First St., Dayton, O.

Sept. 26-28, National Electronics Conference: 1949 conference and exhibit sponsored by Illinois Institute of Technology, Edgewater Beach Hotel, Chicago. Nathan Cohn, Room 1505, 307 N. Michigan Ave., Chicago, heads the exhibits committee.

Sept. 29, American Iron & Steel Institute: Regional technical meeting, Hotel Statler, Buffalo.

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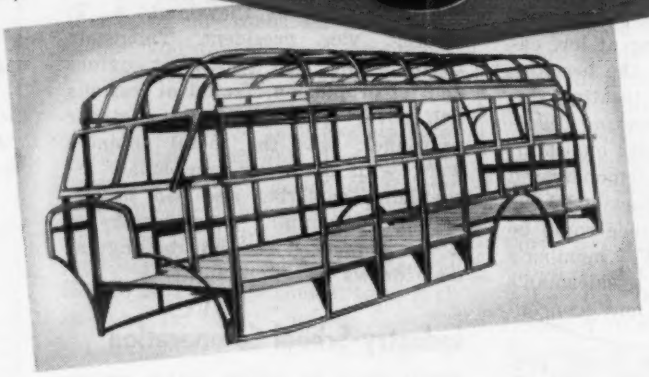
Pictures courtesy of Oneida Products Corp.



The greater strength and toughness of N-A-X HIGH-TENSILE steel permits weight savings of up to 25% in section—and still affords maximum protection against injuries from traffic accidents.

Its superior fatigue-resistance and excellent weldability prolongs this safety-factor . . . reduces maintenance costs over more miles and under all conditions.

If you manufacture a product requiring high strength, toughness and good weldability, it will pay you to investigate N-A-X HIGH-TENSILE.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N·A·X
HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Detroit 18, Michigan

UNIT OF NATIONAL STEEL CORPORATION

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Union's immediate reaction to Ford proposal for 18-month moratorium on economic demands unfavorable, but leaders may be considering recommendations before replying

DETROIT

SEVERAL weeks ago, before the start of the Ford strike, it was suggested in these columns that Local 600 of the UAW-CIO might well consider the advisability of approving a six-month moratorium on its demands for social security benefits, pensions and cost-of-living wage adjustments until the present uncertainty in the economic outlook had crystallized and the business trend was established. However, before any thought could be given to the matter, the precipitate strike action was taken, making it necessary to defer negotiations on a new contract.

Last week, the company itself proposed not a six-month but an 18-month moratorium on economic demands, with a freeze on current wage rates, although it did suggest reviews of the cost-of-living index of the Bureau of Labor statistics on Jan. 15, 1950, and July 15, 1950, with the idea of adjusting hourly rates if the latest published index on those dates showed a change of four points or more in the interim. The proposal is one which might well be given careful thought by all manufacturers now confronted with union demands for wage changes or more "fringe" benefits.

Management-Labor Problem — Today's management-labor problem has become one of long-range employee security and not short-sighted economic advantage, in the opinion of Ford industrial relations vice president, John S. Bugas. The economy is in a downward trend. Some industries already have been affected seriously and it is anyone's guess how long the movement will continue.

There is patent need for a "stabilization" pattern which must recognize the following factors: Rising unemployment which Ford estimates may reach 5 million this summer, as against 1,900,000 in April, a 10 per cent decline in industrial production from last November, declines in the cost of living which place Ford at a continually greater disadvantage competitively with General Motors which adjusts rates downward with the living cost index, a forecasted market of 4,700,000 cars and trucks annually in 1950, 1951 and thereafter, 32 per cent off the current pace of 6,900,000 units annually, and the production loss of 116,587 cars, trucks and tractors resulting from the recent strike.

Ford Proposal—To assure jobs for the maximum number of employees for the period ahead, therefore, Ford proposed that the UAW withdraw all general economic demands for a period of 18 months, in return for which the company will agree to maintain present wage rates for the same period, starting July 16, with the previously mentioned proviso of two reopenings at six-month intervals.

Immediate reaction from the UAW was unfavorable, Walter Reuther calling the suggestion "unrealistic" at the same time the union was sounding off on the need to combat the "rising tide" of unemployment, and warning of the "bad slump" which may be on the way.

To call the Bugas proposal unrealistic in this situation is simply refusing to understand the English language. However, union spokesmen said they wanted more time to prepare a detailed reply, suggesting they may be giving some honest thought to the proposal.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	505,000*	359,996
June		454,401
July		489,736
August		478,186
September		437,181
October		516,814
November		495,488
December		514,337
12 mos.		5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
June 4	98,087	75,607
June 11	137,013	109,831
June 18	144,973	109,259
June 25	146,000	109,259

Estimates by Ward's Automotive Reports

Hydra-matic Outside GM Family

LINCOLN models equipped with General Motors hydra-matic transmission go on display this week, confirming earlier predictions of this development. The transmission is identified as "hydra-matic" and is attested as being "backed by millions of miles of operations." It will be available at extra cost ($200) on both regular and cosmopolitan types.

Several minor engineering changes were made to accommodate the transmission. Narrow wedge belts are used on fan and generator for quieter engine operation. Fan speed has been reduced and a five-blade fan has been substituted for the former four-blade design. A steel plate flywheel replaces the former cast iron type; some changes have been made in the crankshaft and in the carburetor idler to adapt it to the transmission. New upholstery materials, with foam rubber padding, along with 11 new exterior lacquer body colors, are being introduced concurrently.

This marks the first appearance of the GM hydra-matic transmission outside the family, although it is believed likely Nash and possibly Kaiser-Frazer may offer the unit shortly, bringing to six the number of cars to which it has been adapted.

Heat Wave Causes Walkouts

NINETY-degree heat blasted into the motor city last week and, as is usually the case with sudden onslaughts of oppressive, high temperature, was followed by numerous walkouts on day shifts. Chrysler and Hudson bore most of the brunt, with 31,500 leaving their jobs on Monday alone. Tuesday morning, the cleaning room crew at the Dodge foundry decided it had had enough after three hours work and took a walk. Other departments of the foundry followed suit and eventually it was necessary to suspend operations.

Management has become accustomed to taking these "heat leaves" in stride. They are entirely orderly, and all equipment is put in stand-by condition before the men stop work. Through stewards and committeemen

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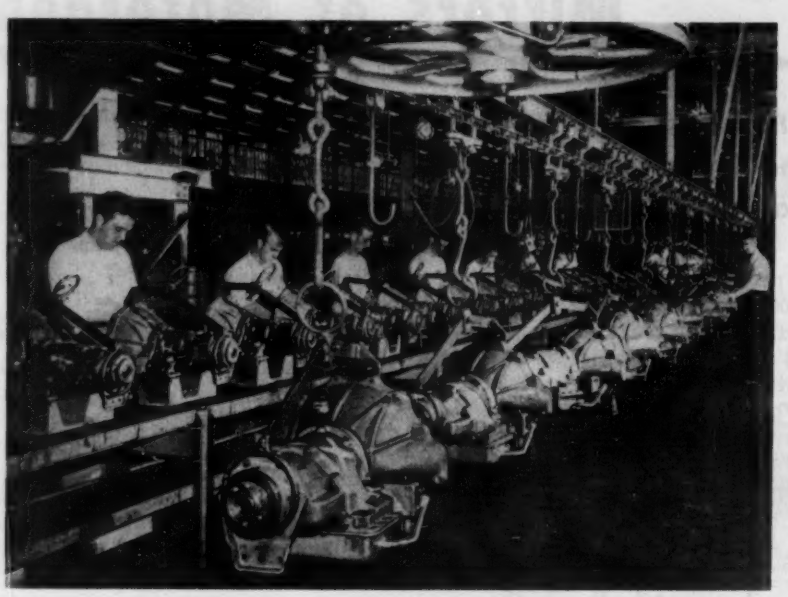


A FLOW OF DYNAFLOWS: Running at capacity, newly installed conveyors and assembly lines at Buick Motor Division, Flint, Mich., are producing daily more than 1200 units of the Dynaflow, torque converter transmission. These additional facilities have helped treble capacity for Dynaflow output. Production began in volume only 15 months ago but already 200,000 units have been turned out

an effort often is made to halt the exodus, but there is seldom any chance of forestalling the action. Fortunately, foundries now have built up a sufficient float of castings ahead of the machine shop so that down time is not too serious.

Union sources at Hudson, commenting on the stoppage there, said the company was planning an indefinite layoff of 2500 of the plant's 10,000 at midweek; however company spokesmen would neither confirm nor deny the report.

New Hudson Development

A PRESS conference with A. E. Barit, Hudson president, last week developed the information that the company's 6 and 8-cylinder engines have been designed with ample strength to be adapted to compression ratios up to 12.5:1, once 100-octane fuel becomes available. A car equipped with a demonstration 6-cylinder engine having 9.3:1 ratio was put through its paces and showed exceptional power and acceleration. All components of this engine were claimed to be of sufficient strength to handle the higher compression ratios, the only important change being in the design of the cylinder head. The engine, as built for regular production, is rated conservatively at 121-hp, with aluminum head providing 7.12:1 ratio.

Question occurring to many was that of valving, since General Motors research has indicated that overhead valves are best suited to the high-compression engine since they permit better fuel distribution, detonation and scavenging in comparison with the L-head engine. Hudson's six and eight are both L-head types and obviously any change to valve-in-head design would entail a heavy expenditure for retooling which the company might not be prepared to make immediately, having just retooled its plant for the 6-cylinder engine at a major cost outlay.

Ford Implement Expansion

IN 30-60 days ground will be broken for a new $2.5 million general office building, laboratory and parts warehouse for Dearborn Motors Corp., national marketing organization for Ford tractors and Dearborn farm equipment. Located on a 45-acre site north of Detroit, near Birmingham, Mich., the buildings will include a main three-floor office building with 85,000 sq ft of space and a separate single-story laboratory and warehouse covering 165,000 sq ft. Principal equipment requirements are chemical, metallurgical and physical testing devices.

Concurrently the company is launching a broad research program, with unlimited funds available, into new methods of agricultural mechanization and the expansion and improvement of present methods. Activities will be under the direction of Ralph E. Hunt, manager of the engineering and manufacturing division.

Dearborn Motors came into being in July, 1947, after the break between Ford and Ferguson. Over 190 different types of implements are offered for use with the Ford tractor, these being manufactured by 25 outside suppliers and a subsidiary, Wood Bros. Inc., Des Moines, Iowa, which builds combines, corn pickers and corn snappers. Half a million implements were sold last year, along with 104,000 tractors.

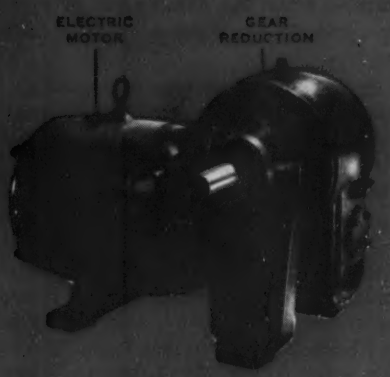
Tractor production currently is at the rate of 500 per day, somewhat higher than the rate at the same time a year ago. Production loss during the Ford strike was 7000 units, reducing inventories of the 2800 Dearborn dealers to about 7800. If present schedules are maintained throughout the year, tractor production should reach 112,000.

The farm equipment market has returned to normal, according to Dearborn Motors officials. Where farmers a year ago were willing to pay premium prices, they are now buying only what they need at the moment and are meeting some offers of reduced prices from dealers. There are an estimated 3.5 million tractors now owned by the nation's farmers. Dearborn Motors, in its position as builder of "machine tools" for the farmer, figures an aggressive research study of soil preparation, cultivation, planting and harvesting can be depended upon to boost this total appreciably over the next few years.

GM Ready To Trim if Necessary

ALTHOUGH current production is being held at the record rate of 12,500 cars and trucks daily, with projections calling for 1 million units in the four months, June—September, General Motors is prepared to trim its schedules the minute field reports indicate dealers are not moving their stocks, and may even conclude the 1949 model run earlier than had been planned if there is danger of dealers being forced to clean up heavy stocks during the winter months. These frank planning details were voiced by GM President C. E. Wilson, at a recent meeting of 400 dealers in Detroit.

He added that the possibility of a coal strike would have no effect on automobile production, but that a steel strike after July 15 would impair September schedules. Alfred P. Sloan, board chairman, also addressed the meeting and declared he could see no tangible evidence of a serious business setback.



Don't put up with make-shift assemblies when it is so easy to get the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

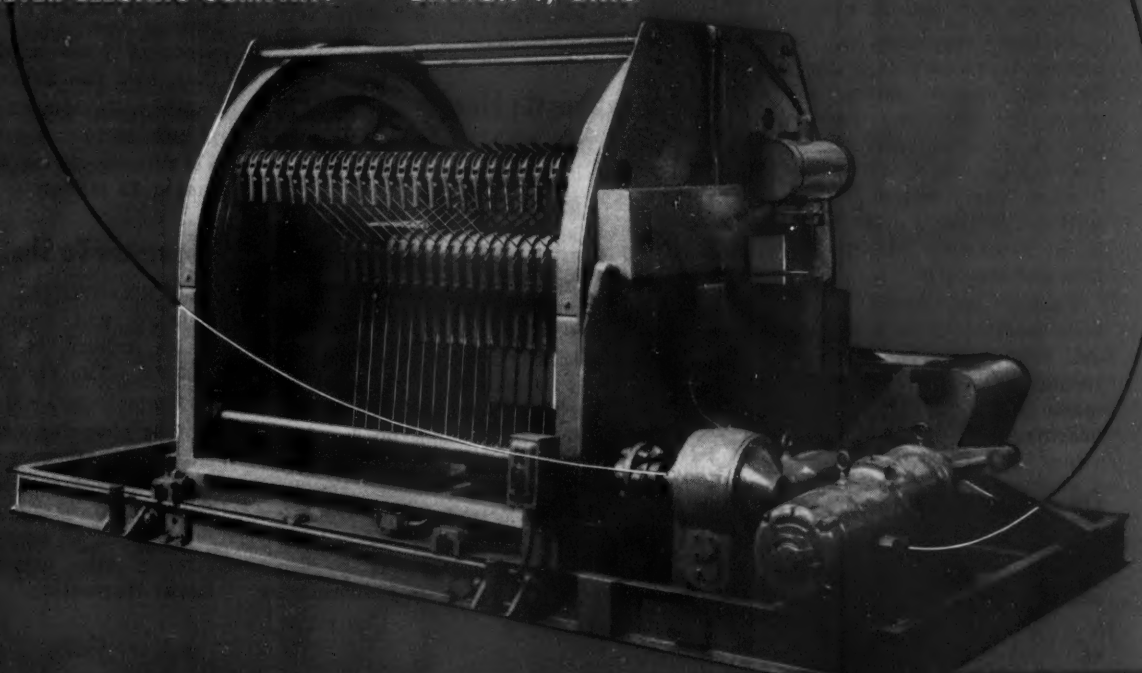
Master Motors are available in millions on millions of types and ratings (up to 150 HP) giving you a selection you can get nowhere else. This permits you to choose a power drive for each job that's just right . . . a power drive that will add greatly to the compactness, appearance, safety, and economy of each of your motor applications.

See how the designer of this brick making machine has used two different Master units that are just right for his purpose . . . one, a motor with right angle worm gear unit, the other a motor with parallel shaft reduction unit and an electric brake for quick controlled stopping.

you can always be right

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor-driven products . . . improve the economy and productivity of your plant equipment. That's the horse-sense way to use horsepower.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



Timken's 50 Years

Company founders originally developed the tapered roller bearing for carriages

TIMKEN Roller Bearing Co., Canton, O., at an open house last week celebrating its 50th anniversary, showed what the elimination of friction can do for a company in a half century.

Predecessor firm was Timken Carriage Co., founded by Henry Timken in St. Louis. Mr. Timken grappled with the problem of squeaking, cumbersome wagon wheels and came up with an answer which, with modifications by sons William R. and Henry H. Sr., is still the basic principle for the company's tapered roller bearings. In 1899 the Timken brothers formed Timken Roller Bearing Axle Co. in St. Louis to make bearings and axles for vehicles still produced by the continuing Timken Carriage Co.

Move to Canton—By 1901 the carriage business was sold and the first plant for bearings and axles only was built in Canton, a city strategically located for the growing automobile industry. In 1909 Timken-Detroit Axle Co., Detroit, was formed to carry on the axle phase of the business, and bearings were manufactured by the renamed Timken Roller Bearing Co. By 1909 Timken began pushing bearing applications into the industrial machinery field, as well as for the auto industry, and in 1919 a separate Industrial Division was organized. In 1915 the company built a steel mill to produce high quality alloy steels. Today the Steel & Tube Division makes alloy bars, seamless tubing, stainless steel, tool steel, specialty steel, flats, hexagons and special shapes.

Another expansion in activities, leading to formation of the Railway Division, began during the 1920s when the company commenced a gradual program of furnishing railroad equipment with roller bearings. Timken organized its first foreign affiliate, British Timken Ltd., in 1928. S. A. Francaise Timken was organized subsequently.

During the 1930s a depression-born product, a rock bit for mining and construction industries, was introduced to use production space made idle by slackening demand for bearings.

TAXES $58,179.00
This looks like a lot of money BUT the Federal Government will spend 2974.9 times this much today.
$173,076,920.00 IN ONE DAY
58,179 SILVER DOLLARS
TAXES

One of the exhibits at Timken's open house last week, this display graphically showed the tax burden levied on the company by government

Open High Voltage Laboratory

EXTENDED study of high voltage phenomena such as corona, sparkover, dielectric breakdown, lightning, etc. has been made possible with the opening of General Electric Co.'s High Voltage Engineering Laboratory in Pittsfield, Mass., on June 23. The new building supplants the first high voltage laboratory constructed in Pittsfield in 1914 and the site of the artificial lightning discharges ranging from one to ten million volts and of more than a quarter of a million amperes.

The greater space of the new $2 million laboratory allows engineers to experiment with voltages up to 15 million volts on larger equipment, including transformers, lightning arresters, capacitors and bushings. Findings to date have been responsible for improved transmission lines which carry power without interruption and for protection of oil tanks, warehouses and other structures from lightning damage.

New Lincoln Electric Plant

LINCOLN Electric Co. will build a $8.5 million plant in Euclid, O.

The entire facility has been designed to reduce materials handling cost to a minimum. Plant and handling equipment are integrated so that movement of all goods is always to the point of next use. The service floor, containing locker rooms, cafeteria, dispensary and space for the Lincoln Welding School, is beneath the production floor. Since the company's manufacturing operations are divided between the production of electrodes and the production of welders, the offices have been placed in the center of the plant. The research and testing laboratories are also placed in this centralized position.

To be constructed by Austin Co., Cleveland, the plant will be ready in 1950 for the transfer of all operations from the present facility, which will be available for sale or lease at that time.

Joy To Acquire St. Louis Company

JOY Mfg. Co., Pittsburgh, will acquire Mines Equipment Co., St. Louis, manufacturer of mine and factory power distribution systems, in a stock transfer deal.

Joy has been exclusive sales agent of Mines Equipment Co. in the mining and oil production industries, and its products have been integral parts of Joy mining and oil field equipment installations. Joy's sales of these products have accounted for more than half the firm's total volume.

Mines Equipment Co. was founded in 1924 and has a net worth of almost $1 million. Sales for 1948 approximated $2 million.

Harvester To Shut New York Unit

INTERNATIONAL Harvester Co., Chicago, will discontinue operations at its Auburn, N. Y., plant on Nov. 1, 1950. The facility produces farm implements and employs about 1800.

"The changing nature of manufacture in the farm implement industry and higher transportation costs put the Auburn plant at a competitive disadvantage," according to Ralph C. Archer, vice president of International Harvester.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

SKF Industries' William Loren Batt made awards to three Purdue University seniors for developing: A tachometer to measure bearing friction, an electric adding machine and a device to record gasoline consumption per mile.

—o—

Thew Shovel Co., Lorain, O., maker of cranes and power shovels, will celebrate its 50th anniversary as a corporation July 17.

—o—

National Military Establishment has awarded a $1,341,637 contract to Ford, Bacon & Davis Inc., New York, for a survey in 37 states and Alaska to determine suitable general areas for the manufacture of synthetic liquid fuels. The new survey will follow the pattern developed by a sample survey made in portions of three states last year by the same firm.

—o—

Line Material Co., maker of electrical distribution equipment, has begun construction of a new office building at W. Michigan and N. Seventh Sts., Milwaukee.

—o—

Federated Metals Division, American Smelting & Refining Co., has been reorganized and its executive offices moved to the company's home office, 120 Broadway, New York. R. A. Quadt, formerly assistant manager of the general aluminum department, has been appointed director of aluminum development.

—o—

Wyatt Metal & Boiler Works, Houston, is fabricating a reactor weighing 284,500 pounds for installation in a hydrocarbon synthesis plant in Brownsville, Texas. The unit will have to be shipped to its destination via the Houston ship channel on a specially built "low-boy" because it is too large for conventional means of transportation.

—o—

Bureau of Mines has developed a new method of feeding pulverized coal so that it flows like water through a pipe to a generator producing synthetic gas required for the manufacture of synthetic liquid fuels. This feeder offers promise of solving the problem of producing gas of uniform composition for the Fischer-Tropsch process for converting coal to oil.

—o—

Magne-Plastic Corp., Mt. Clemens, Mich., has been awarded a contract for magnetic layout process for all naval ordnance plants by the Bureau of Ordnance, U. S. Navy.

—o—

Canadian Industrial Glass Co. Ltd., newly organized subsidiary of Pittsburgh Plate Glass Co., has purchased a window glass producing plant in St. Laurent, Que., from Industrial Glass Co. Ltd. Production will be resumed when repairs are completed.

—o—

National Association of Corrosion Engineers, Houston, has scheduled a short course on corrosion to convene at the University of Texas, Austin, Sept. 12-16.

—o—

Northrop Aircraft Inc., Hawthorne, Calif., has completed arrangements for a $5 million loan from Reconstruction Finance Corp. to supplement future operating capital requirements.

—o—

Koppers Co. Inc., Pittsburgh, has been awarded a contract for construction of a battery of 65 by-product coke ovens and material handling facilities at Republic Steel Corp.'s Youngstown plant. The battery, expected to be placed in operation by mid-1950, will be capable of carbonizing 1505 tons of coal per day.

—o—

Link-Belt Co., Chicago, announces new locations for the following district offices: 314 Hanna Bldg., Cleveland; 2315 St. Paul St., Baltimore; and 1009 Fifth Ave., Huntington, W. Va.

—o—

Great Lakes Carbon Corp., Niagara Falls, N. Y., has opened new facilities at Morganton, N. C., for production of graphite electrodes, anodes and specialties.

—o—

Independent Can Co., operated by officials of Parker Metal Decorating Co. as an independent firm in Parker's Baltimore plant, has been acquired by Harry L. Huether, 237 President St., Baltimore. Equipment is to be moved to the President St. address, to manufacture plain and decorated tin cans. Company name will be retained.

—o—

Syracuse University, Syracuse, N. Y., is conducting an industrial design seminar July 5 to Aug. 12, for professional designers, students and educators.

—o—

Cochrane Corp., Philadelphia, has named Frederick H. Mason Co., Detroit, as representative for its condensate drainage control system in Michigan and the Toledo, O., area. Mr. Mason is now agent in the same territories for Cochrane's feedwater heaters, water softeners and industrial water conditioning specialties.

—o—

Resistance Welder Manufacturers Association, Detroit, reports that orders from foreign countries for resistance welding equipment received by its member companies reached the highest level of the year in April.

—o—

Carborundum Co., Niagara Falls, N. Y., is testing a new machine capable of producing more than 200,000 yards of coated abrasive products daily. The device is operated by a crew of 8 to 12 men.

—o—

Sylvania Electric Products Inc., New York, has formed a Canadian subsidiary to manufacture fluorescent lamps and other lighting equipment. To be known as Sylvania Electric (Canada) Ltd., the new company has leased a plant in Drummondville, Quebec. President is to be F. J. Healy.

—o—

All-State Welding Alloys Co., White Plains, N. Y., announces a way of finding when to braze aluminum. Since there is no red glow by which to judge, the time when ordinary carbon black disappears from metal surface —at approximately 900° F—is the time to braze.

—o—

E. W. Bliss Co., Detroit, will carry on design and manufacture of single and double crank presses up to 250-ton capacity and certain semiautomatic can machinery at its plant in Hastings, Mich. The company is also maintaining a $2.5 million spare parts inventory at the plant for rapid delivery in servicing the Bliss presses now in operation.

—o—

Cummins Engine Co., Columbus, Ind., is now producing a new supercharged diesel engine. Available in automotive, industrial and marine models, the engine develops 300 hp at 2100 rpm.

—o—

Babcock & Wilcox Co., New York, is building six Y-branch castings designed as part of the connecting header between boilers and turbines for plants of the American Gas & Electric System. Four of the castings will go into the Philip Sporn plant at Graham, W. Va., and the others to the Twin Branch plant at Mishawaka, Ind., and the Tanners Creek plant at Lawrenceburg, Ind.

The Business Trend

DESPITE considerable help from the automotive industry, STEEL's industrial production index for the week ended June 18 slumped to 165 per cent (preliminary) of the 1936-1939 average. This represents a drop of 4 points from the index for the preceding week and is a like number of points below the corresponding week last year.

AUTOMOBILES—While the level of activity in other industries continues to slide, the automobile builders of the United States and Canada continue to operate contrary to the trend and keep pushing for greater production. In the week ended June 18, a 12-year high of 144,973 assemblies was reached despite a loss of some 6000 units by two builders due to a wildcat strike at the plant of a body supplier. The all-time high of 663,811 vehicles assembled in April, 1929, is the next target for the industry and should be broken in August unless labor difficulties or other obstacles intervene.

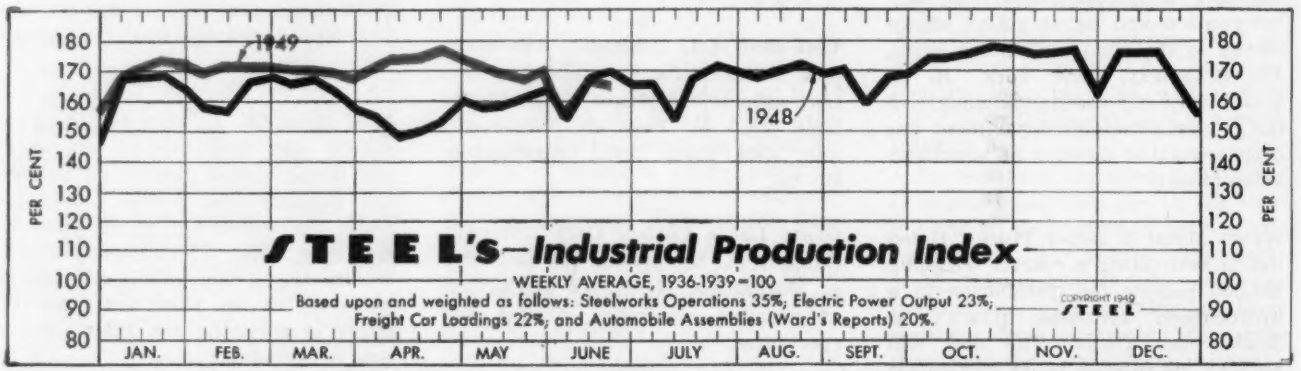
STEEL—Unable to sustain peak operations on the strength of demand by the automobile industry alone, the nation's steelmakers continue to trim their operating rate by taking off marginal and high operating cost units. The weekly ingot rate took its 13th consecutive dip in the week ended June 18 to 86.5 per cent of capacity.

PRICES—The wholesale price index of the Bureau of Labor Statistics dropped 0.8 per cent during the week ended June 14 to 154.8 per cent of the 1926 average and 6.5 per cent below the same date in 1948. Although the major declines were in livestock and meat prices during the latest week, price weakness is evident in most lines. Metals and metal products index, for example, continued downward to 166.1 per cent of the 1926 average but was still 5.1 per cent higher than on the same date a year ago.

COAL—Bituminous coal output reached the highest point for the year during the week ended June 11. Aggregate for the week was 12,960,000 net tons, about 1 million tons higher than for any other week in 1949. Production for the year up to June 11 totaled 240,668,000 tons, approximately 17 million tons less than for the corresponding period in 1948. The gap between production for the two years is due to widen as the preceding figures do not include the week of the miners' "stabilization strike."

CONSTRUCTION — Civil engineering construction volume totaled $150.8 million during the week ended June 16. Although this figure represents a decline of 33 per cent from the preceding week, it is 19 per cent above the corresponding week of last year. The cumulative total of almost $3.6 billion for the first 24 weeks of 1949 is 17 per cent above the corresponding total in 1948.

POWER—Amount of electric energy distributed by the electric light and power industry continues to top year ago levels by more than 3 per cent despite the slackened pace of industrial activity. About 5.3 billion kwhr were distributed during the week ended June 11.



Index (chart above): Week ended June 18 (preliminary) 165 Previous Week 169 Month Ago 167 Year Ago 169

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	86.5	87.5	95.0	96.0
Electric Power Distributed (million kilowatt hours)	5,373	5,300	5,255	5,159
Bituminous Coal Production (daily av.—1000 tons)	2,160	1,675	1,842	2,220
Petroleum Production (daily av.—1000 bbl)	4,868	4,876	4,904	5,492
Construction Volume (ENR—Unit $1,000,000)	$150.8	$226.2	$157.8	$126.9
Automobile and Truck Output (Ward's—number units)	144,973	137,013	116,878	109,259

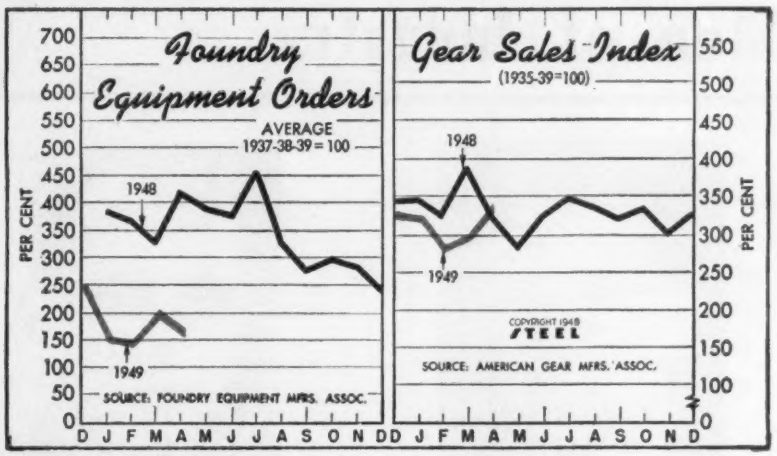
* Dates on request. † 1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.

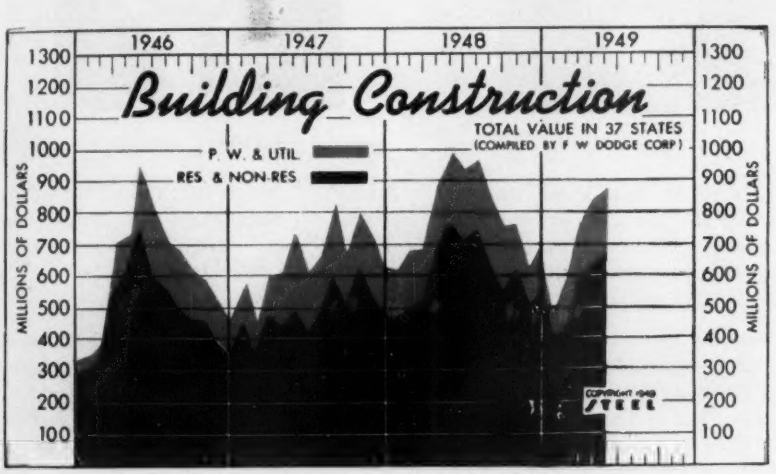
TRADE				
Freight Carloadings (unit—1000 cars)	610†	808	774	907
Business Failures (Dun & Bradstreet, number)	196	174	172	100
Money in Circulation (in millions of dollars)‡	$27,391	$27,484	$27,392	$27,808
Department Store Sales (changes from like wk. a yr. ago)‡	−5%	−8%	−3%	+1%

† Preliminary. ‡ Federal Reserve Board.

	Foundry Equipment Orders* Index (1937-38-39=100) 1949	1948	Gear Sales Index (1935-39=100) 1949	1948
Jan.	149.9	380.9	320.7	346.8
Feb.	144.4	367.3	282.3	324.4
Mar.	190.8	326.2	299.1	389.8
Apr.	112.0	412.0	339.0	320.9
May	....	388.5	....	283.6
June	....	376.8	....	324.1
July	....	456.3	....	348.4
Aug.	....	324.7	....	335.6
Sept.	....	273.5	....	320.4
Oct.	....	296.0	....	333.3
Nov.	....	284.4	....	309.0
Dec.	....	243.7	....	325.9

*By foundry trades only.


Foundry Equipment Orders
AVERAGE 1937-38-39 = 100
1948
1949
PER CENT
SOURCE: FOUNDRY EQUIPMENT MFRS. ASSOC.
Gear Sales Index
(1935-39=100)
1948
1949
COPYRIGHT 1949 STEEL
SOURCE: AMERICAN GEAR MFRS. ASSOC.
PER CENT
D J F M A M J J A S O N D D J F M A M J J A S O N D

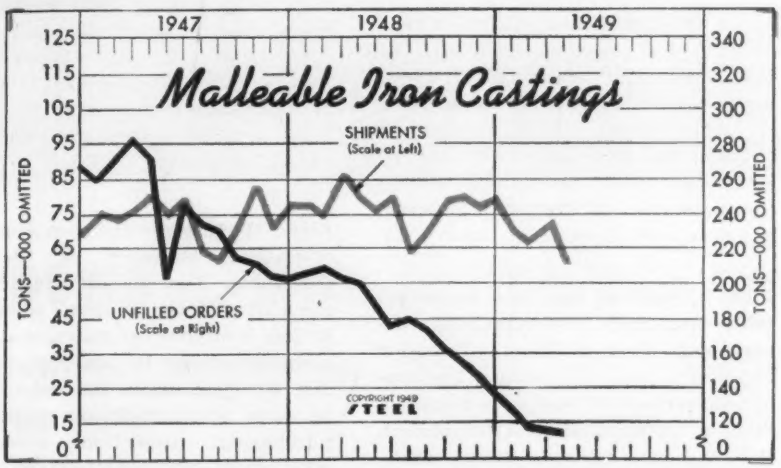


Construction Valuation in 37 States
(Unit—$1,000,000)

	Total 1949	Public Works Utilities 1949	1948	Residential and Non-residential 1949	1948
Jan.	483.0	102.0	136.6	381.0	478.6
Feb.	568.5	153.5	177.3	415.0	504.6
Mar.	747.6	168.4	164.3	579.2	525.5
Apr.	842.6	222.4	184.7	620.2	689.2
May	880.3	213.5	205.0	666.9	765.8
June	....	....	215.7	....	719.5
July	....	....	217.9	....	744.8
Aug.	....	....	207.8	....	646.3
Sept.	....	....	202.7	....	559.5
Oct.	....	....	165.5	....	613.1
Nov.	....	....	106.9	....	504.3
Dec.	....	....	170.9	....	523.1
Total	....	....	2,155.3	....	7,274.4

Malleable Iron Castings

	Shipments (000 omitted) 1949	1948	Unfilled orders for castings for sale (000 omitted) 1949	1948
Jan.	71.9	77.7	126	206
Feb.	66.7	75.2	118	209
Mar.	72.1	86.8	102	203
Apr.	61.3	80.6	95	200
May	...	76.1	...	192
June	...	81.7	...	179
July	...	64.9	...	180
Aug.	...	73.3	...	177
Sept.	...	77.8	...	164
Oct.	...	81.8	...	158
Nov.	...	77.2	...	146
Dec.	...	79.9	...	137
Total	...	933.1	...	...



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,244	$13,191	$13,778	$14,248
Federal Gross Debt (billions)	$251.7	$251.6	$251.7	$251.5
Bond Volume, NYSE (millions)	$15.5	$16.1	$15.6	$25.2
Stocks Sales, NYSE (thousands)	4,634	4,604	4,361	7,727
Loans and Investments (billions)†	$61.9	$62.3	$62.0	$63.4
United States Gov't. Obligations Held (millions)†	$34,347	$34,035	$34,111	$35,667

† Member banks, Federal Reserve System.

PRICES

STEEL's Composite Finished Steel Price Average	$91.82	$92.09	$93.55	$80.27
STEEL's Nonferrous Metal Composite‡	166.7	169.6	183.0	200.9
All Commodities†	154.8	156.1	156.0	165.5
Metals and Metal Products†	166.1	167.2	168.0	158.0

† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100.

Men of Industry

W. J. LONG

W. G. STEWART

ROBERT A. SPECHT

W. J. Long and **W. G. Stewart** have been elected vice presidents of Universal-Cyclops Steel Corp., Bridgeville, Pa. Mr. Long has been with the company for 20 years in various sales positions, serving as manager of tool steel sales since 1945. Mr. Stewart has been assistant secretary since 1942, and has been with the company 20 years in various sales and administrative capacities.

—o—

Roger W. Batchelder has been appointed vice president in charge of sales, National Bearing Division, American Brake Shoe Co., New York. He will continue to be located at division headquarters in St. Louis. Mr. Batchelder, formerly assistant to the president of National Bearing, has been with Brake Shoe since 1933.

—o—

John A. Sullivan has been appointed sales manager, merchandising department, Jack & Heintz Precision Industries Inc., Cleveland. Previous to war service he was sales manager, table & traffic appliance department, Westinghouse Electric Corp., Pittsburgh, and following his discharge from the armed services, he served as sales manager, Home Appliance Division, General Mills.

—o—

Bradford T. Blauvelt has been elected comptroller of ATF Inc., Elizabeth, N. J. He has been a vice president and director of American Type Founders Inc., and American Type Founders Sales Corp., members of the ATF Inc. group of companies, and continues in those posts.

—o—

Cutler-Hammer Inc., Milwaukee, announces appointment of **W. R. Reinhold** as manager of refrigeration sales to succeed **R. M. Van Vleet,** who retired after 45 years of service with the company. Mr. Reinhold has been assistant manager in the department.

—o—

H. L. Smalley has been appointed assistant to the president of Harbison-Walker Refractories Co., Pittsburgh. He became associated with the company in 1922 in the general office, and was later transferred to the Chicago sales office and in 1928 named Chicago district sales manager, with supervision over the Chicago, Detroit and Indianapolis area. He was appointed assistant to the vice president in 1948, returning to the company's Pittsburgh office.

—o—

Elmer W. Krueger has been appointed operations manager of Cleveland Pneumatic Tool Co., Cleveland. Associated with the company since 1922, he has been general manager of sales administration. In his new position Mr. Krueger heads the departments of sales administration, engineering, purchasing, inspection, production, mechanical and maintenance operations, and industrial relations. **John M. Chapman** has been appointed to succeed Mr. Krueger. He formerly was with Fairchild Aircraft Co. as purchasing agent, and joined the Cleveland firm in February of this year.

—o—

Frank L. Snyder has been appointed manager, Transformer Division, Westinghouse Electric Corp., Pittsburgh. He succeeds **John K. Hodnette,** vice president, who recently became general manager of industrial products, with headquarters in Pittsburgh. Mr. Snyder formerly was engineering manager for the division, which he joined in 1925 as a design engineer. Succeeding Mr. Snyder as Transformer Division engineering manager is **John H. Chiles Jr.**

—o—

Robert A. Specht has been appointed manager of a new Heat Transfer Division which National Radiator Co., Johnstown, Pa., has created to handle the design and sales of heat transfer products for chemical, petroleum, gas and steel industries. He will have headquarters at New York.

—o—

Norton Co., Worcester, Mass., announces the following changes in territory assignment: **Henry A. Blessing,** formerly Chicago field engineer, has been appointed abrasive engineer responsible for a new territory, with headquarters in Des Moines, Iowa. **Myles A. Snyder,** Worcester sales engineer, has been appointed Chicago field engineer. **David H. Paul,** also of the Worcester sales engineering department, has been named abrasive engineer in charge of a new territory, with headquarters in Memphis, Tenn.

—o—

Ora F. Metz will retire July 1 as district manager of the El Paso, Tex., and Phoenix, Ariz., offices of Allis-Chalmers Mfg. Co., Milwaukee. He has had 43 years' association with the company. With Mr. Metz's retirement, the El Paso office becomes a branch under the Phoenix office, with **John E. Despins** as manager. **W. C. Kinnon,** who was manager of the Phoenix branch office, continues as manager of the new district office.

—o—

Clarence M. Strong has been appointed director of purchases for Gar Wood Industries Inc., Detroit. For

BEARING FAILURES DOWN... STEEL PRODUCTION UP

Sun Grease Increases Production by Cutting Bearing Failures 92%

Burned-out table roll bearings were causing loss of valuable production-time in a steel mill. The failures—as many as five a week—were due to the grease melting and running out as a result of heat reflected from the steel plates. Each bearing-replacement cost $80, not counting labor cost.

A Sun Engineer who was called in recommended a high-melting-point grease that had proved its ability under similar conditions.

With this Sun lubricant on the job, 92 percent of the bearing failures have been eliminated. A cash saving of about $18,000 a year has resulted, and additional economies have been realized from greater production, power savings, and lower grease costs.

Sun "Job Proved" lubricants are helping to increase production, and to cut maintenance costs, in every kind of industry. What they do for others, they can do for you. For full information, call or write your nearest Sun Office.

SUN OIL COMPANY · ***Philadelphia 3, Pa.***

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Toronto and Montreal

SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

a number of years he was active in the purchasing department of Ford Motor Co., and recently was director of purchases, F. L. Jacobs Co., Detroit.

—o—

Electric Machinery Mfg. Co., Minneapolis, has appointed **Alfred J. Kroog** as sales representative for Georgia. Mr. Kroog was associated with General Electric Co. for 17 years, covering the southeastern states in the engineering and sale of electrical and mechanical power apparatus.

—o—

W. H. Lamb, formerly general manufacturing manager for television tubes, Sylvania Electric Products Inc., New York, has been appointed general manager of a new division which will specialize in design, engineering and production of viewing tubes for television receivers. This division will establish headquarters at Seneca Falls, N. Y., and will continue operations in plants there, at Ottawa, O., and Emporium, Pa., which were formerly operated by the cathode ray department of the Radio Division.

—o—

Arthur K. Watson, assistant to the manager of World Trade Division, International Business Machines Corp., New York, has been elected vice president and a director of International Business Machines Co. of Delaware, which directs operation of IBM business throughout the world outside of the United States. **George H. Sheppard,** president, International Business Machines Co. Ltd. of Canada, and **James G. Johnston,** general manager of IBM World Manufacturing, were also elected as directors of IBM of Delaware.

—o—

Edwin F. Gould, who has been with Anaconda Wire & Cable Co., New York, for the last 20 years, has been elected president of Harvill Corp., Los Angeles, succeeding **Harry R. Gillett,** resigned.

—o—

Marshall A. Shapiro, California Metals Co., Oakland, Calif., has been appointed a member of the national affairs committee of the Institute of Scrap Iron & Steel Inc., Washington.

—o—

Harry A. May has been elected president, American Coal Sales Association, Washington.

—o—

New appointments for the sale and engineering of industrial products for Westinghouse Electric Corp., Pittsburgh, are **Tomlinson Fort,** manager, apparatus sales department; **William W. Sproul,** sales manager, industrial products; and **Royal C. Bergvall,** engineering manager, industrial products.

—o—

Hobart C. Ramsey has been elected president of Worthington Pump & Machinery Corp., Harrison, N. J., succeeding **Clarence E. Searle,** who is vice chairman of the board. **Edwin J. Schwanhausser** was elected executive vice president, and **John J. Summersby,** vice president in charge of sales. Mr. Ramsey, executive vice president since 1945, joined the corporation in 1920 as a sales engineer, later becoming manager, foreign department, and vice president in charge of engineering and manufacturing. Mr. Searle, who became associated with the corporation in 1932 as vice president in charge of sales and has been president since 1945, will also continue as chairman of the corporation's management committee. These changes will become effective July 1.

—o—

A. D. Bowman of A. D. Bowman Inc., who has represented Union Metal Mfg. Co., Canton, O., in Connecticut since 1939, has opened an office at 60 E. 42nd St., New York, with **Henry G. Thole,** formerly vice president, Seaboard Surety Co., New York, in charge as manager. Mr. Bowman will continue his headquarters at Waterbury, Conn., and will represent Union Metal in western Massachusetts, eastern New York and northern New Jersey, in addition to the Connecticut area.

—o—

Robert Ervin, Max Unseld and **A. Reed Schuster** have been added to the development engineering staff of Lukens Steel Co., Coatesville, Pa., to engage in designing and developing of equipment for the pulp and paper industries.

—o—

Darwin S. Wolcott, vice president, Lukens Steel Co., Coatesville, Pa., will retire July 9 after 24 years' association with the company.

—o—

Clyde Williams, director, Battelle Memorial Institute, Columbus, O., has received the honorary degree of doctor of engineering at Michigan College of Mining & Technology, Houghton, Mich.

—o—

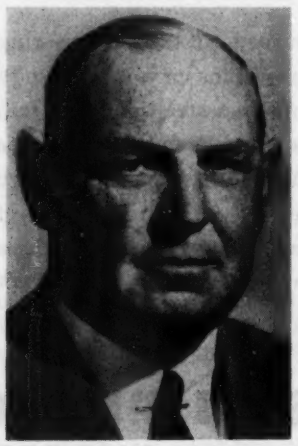
John A. Plimpton has been appointed division manager, Pennsylvania Crusher Co., Philadelphia, a division of Bath Iron Works Corp. He succeeds **Stanley D. Hartshorn,** who has completed 25 years of service with the company. Mr. Hartshorn will remain active in the organization as consultant on sales and engineering problems, and as independent sales agent in New York and eastern Canada.

—o—

General Electric Co., construction materials department at Bridgeport, Conn., announces the following appointments: **Don C. McKinley,** formerly in charge of air conditioning and refrigerator sales in the New York district, has been named

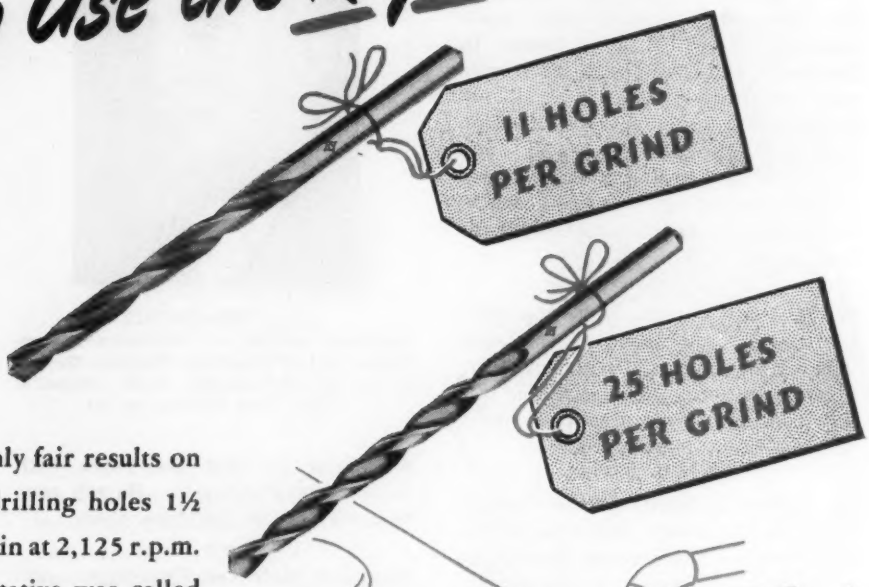
ARTHUR K. WATSON

CLARENCE E. SEARLE



HOBART C. RAMSEY

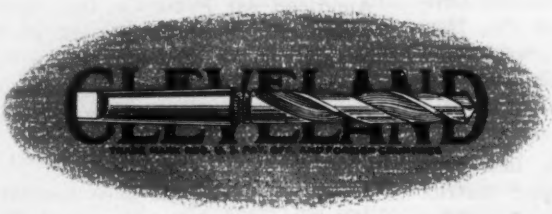
It Pays to Use the Right Drill

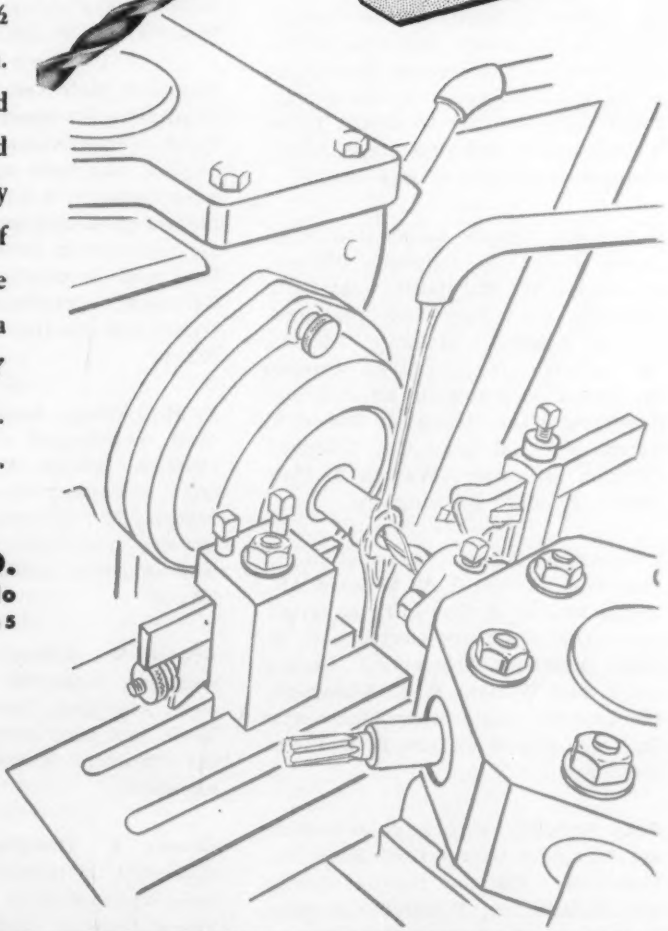


A midwestern plant was getting only fair results on a difficult machining operation—drilling holes 1½ inches deep in a stainless steel link pin at 2,125 r.p.m. ◈ A *Cleveland* Service Representative was called in. He studied the job carefully, and recommended a CLE-FORGE High Speed Drill that was especially designed for this type of work. Result: Number of holes per grind was *more than doubled*. Both were stock drills; both priced the same. But what a difference in performance! ◈ Perhaps a *Cleveland* Service Representative can be equally helpful to *you*. Get in touch with our nearest Stockroom, or . . .

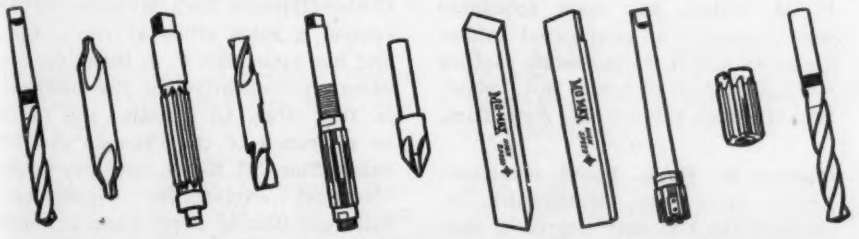
Telephone Your Industrial Supply Distributor.

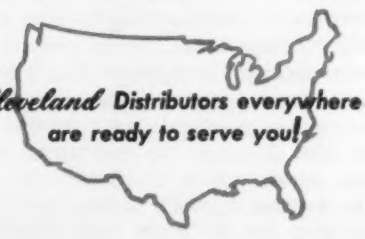
THE CLEVELAND TWIST DRILL CO.
1242 East 49th Street Cleveland 14, Ohio
Stockrooms: New York 7 • Detroit 2 • Chicago 6 • Dallas 1 • San Francisco 5
Los Angeles 11 • London W. 3, England





ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER CLEVELAND TOOLS





a wire and cable specialist for the southeastern district, with headquarters in Atlanta, and **William L. Immer,** manager of sales service, Welding Equipment Division, Schenectady, N. Y., named wire and cable specialist for the central district, with headquarters in St. Louis; **James D. Brown Jr.** and **Clarence W. Ford** have been appointed building project specialists, with headquarters in Houston and Los Angeles, respectively; and **Raymond T. Lyons** has been appointed operating manager, southwestern district warehouse, with offices at Houston.

—o—

W. R. Patterson has been appointed general superintendent of the steel department at the Torrance, Calif., plant of National Supply Co., and will also continue in his present capacity as chief plant metallurgist.

—o—

Dr. Robert F. Mehl, director, metals research laboratory, and head of the metallurgical engineering department at Carnegie Institute of Technology, Pittsburgh, will fly to Brazil to be a guest at the 50th anniversary of the Research Institute of Sao Paulo.

—o—

Purchasing Agents Association of St. Louis elected the following officers: President, **D. M. Baker,** Day-Brite Lighting Inc.; first vice president, **F. J. Connell,** Moloney Electric Co.; second vice president, **Preston M. Green,** Combustion Engineering-Superheater Inc.; treasurer, **Robert F. Toma,** National Lead Co., Titanium Division; secretary, **Warren J. Matthews,** Falstaff Brewing Co.

—o—

Purchasing Agents Association of New York elected **G. W. Howard Ahl,** Philip Morris & Co. Ltd., as president. Other officers elected are: **R. Park Lamborn,** Kennecott Copper Corp., and **William P. E. Ainsworth,** Combustion Engineering-Superheater Inc., vice presidents, and **E. B. Fields,** treasurer.

—o—

J. C. Vaught, formerly co-ordinating engineer with George Koch Sons Inc., Evansville, Ind., is now connected with Futura Inc., Evansville, as sales engineer for the Industrial Division.

—o—

Robert J. McKenna, formerly vice president of Storms Drop Forging Co. of Springfied, Mass., is now associated with Billings & Spencer Co., Hartford, Conn., manufacturer of precision and commercial drop forgings, as its New England representative. He has many years of experience in the forging industry, having been associated for 23 years with Storms,

H. O. TRUMPFHELLER

Appointed manager of manufacturing, Locomotive & Car Equipment Divisions, General Electric Co., Schenectady, N. Y. Noted in STEEL, June 20 issue, p. 94

and prior to that six years with Moore Drop Forging Co. He will have headquarters at Hartford, Conn.

—o—

Horace F. McIntyre, Philadelphia representative for Special Chemicals Division, Pennsylvania Salt Co., Philadelphia, has been appointed district sales manager of a new district office formed to encompass New York, New Jersey, eastern Pennsylvania, Maryland and Delaware. **J. W. Beaver,** Baltimore representative, has been transferred to the Philadelphia territory.

—o—

P. B. Lowery has been appointed chief metallurgist of Pontiac Motor Division, General Motors Corp., Detroit, succeeding the late **Zar T. Crittenden.** Mr. Lowery has been with Pontiac since 1922. **A. H. Robinson** was appointed assistant chief metallurgist.

—o—

George W. Russell, assistant sales manager, Industrial Chemicals Division, American Cyanamid Co., New York, has been elected president of the Chemical Market Research Association.

—o—

George J. Albright Jr. has been appointed Memphis, Tenn., district sales representative, Baker Industrial Truck Division, Baker-Raulang Co., Cleveland.

—o—

F. M. Urban has been appointed sales manager of engineered rubber products, and **H. Leon Moran,** factory manager, Fort Wayne, Ind., plant, United States Rubber Co., New York.

—o—

Charles R. Hook, board chairman, Armco Steel Corp., Middletown, O., received the honorary degree of doctor of laws at Harding College, Searcy, Ark.

—o—

Electric Metal Makers Guild Inc., Pittsburgh, has elected the following officers for the coming year: President, **F. O. Lemmon,** Ohio Steel Foundry Co., Springfield, O.; vice president, **E. J. Chelius,** Carnegie-Illinois Steel Corp., at Duquesne, Pa., and secretary and treasurer, **R. J. McCurdy,** Republic Steel Corp., at South Chicago, Ill.

—o—

Frank R. Denton has been elected a director of Scaife Co., Pittsburgh, filling the vacancy caused by the death of **James M. Magee.**

—o—

Harry R. Reynolds has been appointed consulting engineer, and **Howell L. Potter** as Mr. Reynolds' successor in the position of chief engineer, Fafnir Bearing Co., New Britain, Conn.

—o—

Robert Montgomery, for the past two years comptroller of Willys-Overland Motors Inc., Toledo, O., has been appointed assistant to the first vice president.

—o—

Roy E. Wilson, assistant advertising manager, Wheeling Steel Corp., Wheeling, W. Va., has resigned.

—o—

Dow Warren has been appointed sales manager of the newly formed Plasteel Division of Buie-Lunsford Co., district representative in the Houston area for Plasteel Products Co., Washington, Pa.

—o—

George M. Baumann has been appointed purchasing agent and assistant to the plant manager, Federated Metals Division, Whiting plant, Whiting, Ind., American Smelting & Refining Co.

—o—

American Air Filter Co. Inc., Louisville, announces appointment of Industrial Sales & Engineering Co. operated by **C. W. Dean** as dust control representative for the Memphis, Tenn., territory.

—o—

Gerald A. Fleet has been appointed district manager for American Well Works, Aurora, Ill., and will serve the New York district.

—o—

Cutler-Hammer Inc., Milwaukee, has opened a sales office at Gary, Ind., and has appointed **F. J. Burd,** former sales representative for the company in that area, to manage the office as a branch of the Chicago district sales office. **H. Kolar,** formerly in the electrical engineering department, Carnegie-Illinois Steel Corp.'s South

JOHN S. MICHIE

Appointed works manager, Reeves Pulley Co., Columbus, Ind. Noted in STEEL, June 20 issue, p. 95

HARLEY A. GARDNER

Appointed treasurer, Willard Storage Battery Co., Cleveland. Noted in STEEL, June 20 issue, p. 90

RAY P. POWERS

Appointed manager of quality control, Lincoln-Mercury Division, Ford Motor Co., Detroit. Noted in STEEL, June 20 issue, p. 94

Chicago Works, will assist Mr. Burd in handling sales work in the Indiana territory.

—o—

George S. Jones Jr., vice president in charge of sales at Servel Inc., Evansville, Ind., has been named vice president and assistant to the president. **John K. Knighton,** assistant vice president, has been appointed general sales manager.

—o—

C. Dean Lowry has been elected president, Sioux Metal Products Co., Bedford, O. He joined the organization last fall in the capacity of vice president in charge of sales. Identified with the metal and glass trade during his entire business career, Mr. Lowry had association with Brasco Mfg. Co. and the Alumiline Co., and was a member of Libbey-Owens-Ford Glass Co., Toledo, O., for more than a decade.

—o—

Purdue University, Lafayette, Ind., has conferred honorary degrees upon the following alumni: Doctor of engineering to **Percy H. Batten,** chairman, Twin Disc Clutch Co., Racine, Wis.; **A. Burton Cohen,** consulting bridge engineer, New York; **Frederic A. Schaff,** chairman, Combustion Engineering-Superheater Inc., New York; and **Games Slayter,** vice president in charge of research, Owens-Corning Fiberglas Corp., Newark, O.; and doctor of laws to **William A. Atkins,** vice president, E. C. Atkins & Co., Indianapolis.

—o—

Ellsworth E. Kimmel has joined Koppers Co. Inc., Pittsburgh, as assistant to the technical adviser for the Chemical Division. He was manager of the research laboratory for coal chemicals and synthetic resins, Interlake Chemical Corp.

OBITUARIES . . .

Ralph M. Bowman, purchasing agent for the Refractories & Alloys Division, Republic Steel Corp., Cleveland, died June 18 after a brief illness. His association with the corporation dates from 1923 when he joined the United Alloy Steel Corp. in Canton, O. He went to Cleveland when Republic Steel was expanded by mergers that included United Alloy.

—o—

William A. Falls, 58, president, Falls Spring & Wire Co., Detroit, and Great Lakes Spring Co., Chicago, died June 14 in Detroit. He spent his entire industrial career in the manufacture of springs for automotive and related users, and at one time was general manager of L. A. Young Spring & Wire Co.

—o—

Ralph B. Brown, 43, president, Salem Steel Co., Winston-Salem, N. C., died June 13.

—o—

Lawrence J. Sinnot, 59, general manager, Fractional Motors Co., Beloit, O., died June 19. During the last war Mr. Sinnot was a technical adviser to General Motors Corp. at its Cleveland bomber plant, and later had association with Lees-Bradner Co. and Hertner Electric Co., Cleveland.

—o—

John H. Goodwin, 53, owner, John Goodwin Sheet Metal Works, Milwaukee, died June 19.

—o—

Joseph F. Westendorf, 80, head of the Premier Rubber Co. and founder and president of Dayton Castings Co., Dayton, O., died recently.

—o—

Herbert J. Higgins, 55, a statistician employed by United States Steel Corp., New York, died June 19 of a heart attack. He had been associated with the corporation for 37 years.

—o—

J. J. Freney, 46, industrial division manager, Philadelphia apparatus sales office, General Electric Co., died of a heart attack recently.

—o—

Robert P. Page Jr., 70, chairman of the board of Autocar Co., Philadelphia, died June 18 of a heart attack. He joined the company in 1910 as a salesman, was elected a vice president in 1927, and shortly thereafter was elevated to the presidency.

—o—

Samuel Jones, 70, a director and vice president, J. G. White Engineering Corp., New York, died June 18 in Cranford, N. J.

—o—

Joseph P. Babcock, 56, chief counsel for the administrative offices, General Electric Co., Schenectady, N. Y., died June 19 following a heart attack.

—o—

Charles E. Nelson, 75, president, Nelson Iron Works, Seattle, died June 12.

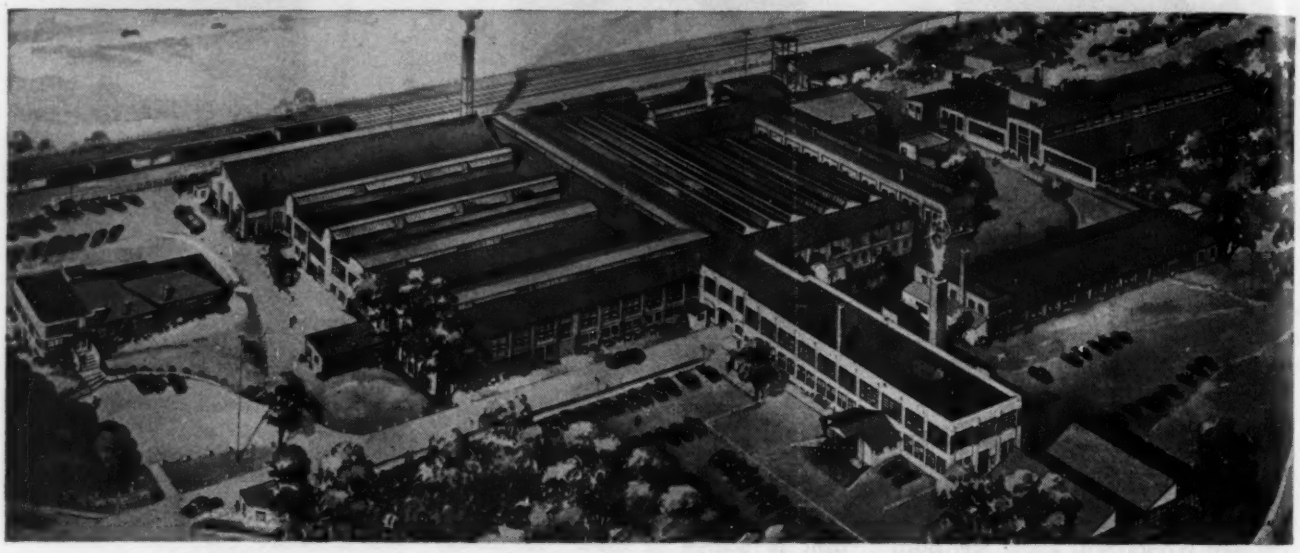
—o—

J. P. Hilands, general manager of sales, Tube Reducing Corp., Passaic, N. J., died June 18.

—o—

Earl C. Souder, for 20 years an industrial sales engineer in the steel mill section, East Pittsburgh plant, Westinghouse Electric Corp., died recently.

Cleveland builds security in every link!



Factory headquarters and general offices of The Cleveland Chain & Mfg. Co., and its associate, David Round & Son, Cleveland, Ohio. Similar plants are operated by associate companies in Bridgeport, Conn.; Seattle, Wash.; So. San Francisco, Cal., and Trenton, N. J.

SIX plants of The Cleveland Chain & Mfg. Co. and its associate concerns produce chain of every type . . . to meet every home, farm, automotive and industrial chain need.

History of the Cleveland organization, now in its 80th year, is typical of American industry under our free enterprise system.

David Round, company founder, learned his trade as an apprentice in his father's hand-forge chain shop in Staffordshire, England. His first chain works, established in 1869 at Newburgh (near Cleveland), was little more than an enlarged blacksmith shop.

But, Mr. Round's insistence upon master craftsmanship . . . his refusal to compromise with quality resulted in constant business growth.

Today, Cleveland Chain is sold throughout the world . . . preferred by users who demand utmost security in every link.

CLEVELAND CHAIN

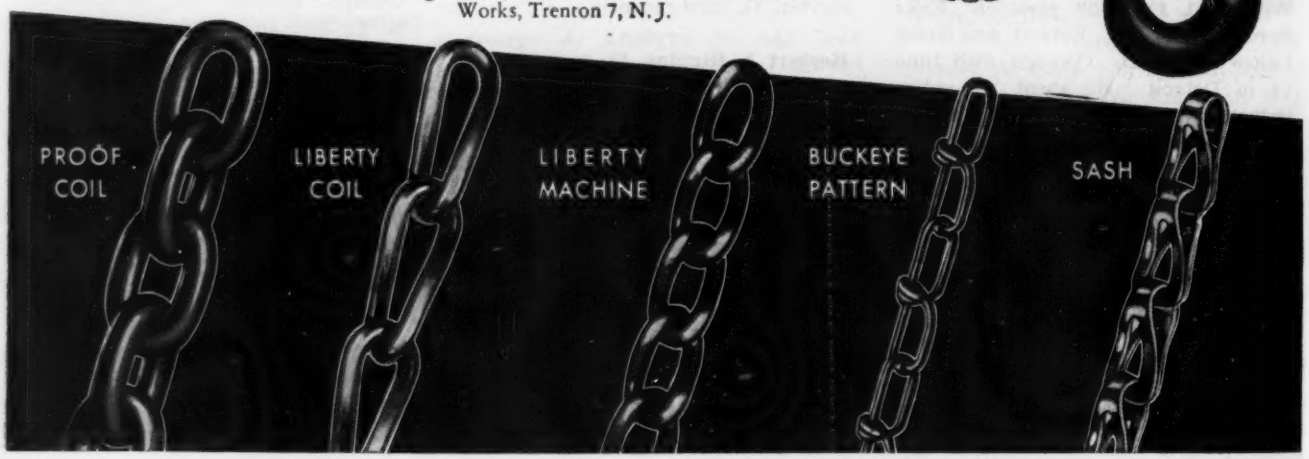
The Cleveland Chain & Mfg. Co.

Cleveland 5, Ohio

Associate Companies: David Round & Son, Cleveland 5, Ohio. • The Bridgeport Chain & Mfg. Co., Bridgeport 1, Conn. • Seattle Chain & Mfg. Co., Seattle 8, Wash. • Round California Chain Co., So. San Francisco and Los Angeles 54, California • Woodhouse Chain Works, Trenton 7, N. J.

Since DR *1869*

Certified CHAIN INSTITUTE Member



Engineering News
. . . AT A GLANCE

"SOUND WAVE" METALLURGY— Ultrasonics are steadily moving into the field of metallurgy according to a report by Central Scientific Co. of Chicago. A few of the metallurgical uses, it is pointed out, are the crystallization of low melting point melts, nitrogen hardening of steel and the elimination of hydrogen after plating. According to the company, melts such as tin and aluminum solidify more rapidly when subjected to high frequency sound waves. The structure also has a finer grain after treatment. While little information is available on specific processes of the formation of mixed crystals, and the action by ultrasonics on compounds between metals, the field is ready for commercial development.

HARD SHAKER— A vibration unit recently delivered to a government agency by Baldwin Locomotive Works from its Sonntag plant is reported to shake loads up to 1000 pounds at 600 to 3600 cycles per minute with a simple harmonic, horizontal motion having total amplitudes up to 0.124-inch. The table has a clear horizontal surface 4 x 6 feet on which equipment to be tested may have a center of gravity as high as 24 inches. Vibration is produced by a mechanical oscillator that is rigidly attached to the table, and consists of two adjustable eccentric disks rotating on vertical eccentric shafts in opposite directions.

FLOOR WITH A PURPOSE— Sixty-pound steel rails set in pairs on a concrete base to cover a floor area of 7992 square feet in the plant of Dravo Corp., Pittsburgh, not only provide a firm foundation for assembly of steel sections of towboats and barges, but also act as a "tool" for leveling and squaring sections under construction—holding them to prevent skewing or warping during welding. Steel beams formerly used, according to the company, had to be set, leveled and shimmed for each new job. The concrete-embedded rails eliminate man-hours required for that operation, and also save time in final assembly work by enabling sections to be prefabricated more accurately.

"MASS" COMPRESSING— Largest single installation of centrifugal compressors thus far reported, consisting of 24 units having a total of more than 80,000 installed horsepower, soon will be in operation at the Carthage Hydrocol Plant at Brownsville, Tex. These centrifugals designed by Clark Bros. Co. Inc., one of the Dresser Industries, are reported capable of compressing six different kinds of gases varying from the air we breath to pure explosive oxygen. Volume of air compressed in just 1 minute by a single air compressor unit is said to be equal to the volume enclosed in a pipe 12 inches in diameter and 27 miles long.

INCREASES MACHINABILITY— When used in automatic screw machine operations, a new bessemer steel stock developed by Carnegie-Illinois Steel Corp., Pittsburgh, is reported to provide substantially longer tool life and greatly improved surface finish of parts with up to 20 per cent increase in machinability over standard bessemer stock of comparable grades. The free machining steel, under development by the U. S. Steel corporation subsidiary for over 5 years, is said to augment the machining characteristics of grade B-1113 steel in many applications where that grade was recommended formerly. Currently the steel stock is being turned out in hot rolled and cold finished forms.

HOT-SHORTNESS FACTOR—Forgeability of steels containing boron to the extent usually found to produce hot-shortness is apparently related to the fact that sufficient titanium was present to combine with the carbon, according to G. F. Comstock, assistant director of research, Titanium Alloy Division, National Lead Co. In his discussion on titanium and its alloys, he reports that evidence shows that it is not boron or a boride that promotes hot-shortness, but rather a low-melting ternary iron-boron-carbon eutectic which melts at ordinary hot-working temperatures. With carbon fixed as titanium carbide, he states, this fusible eutectic is not formed, and the steel can be hot worked. (p. 58)

MASS BUFFING—Twelve-station indexing machines are used by Ford for mass buffing auto hub caps at the rate of about 600 per hour. Machines comprise a 10-foot, 2-ton turntable around the periphery of which are mounted 12 equispaced vertical spindles carrying chucks on which the hubs are mounted and locked in a flat position. Buffing, which includes "cutting" and "coloring", is done by eight individual adjustable floating-head buffing lathes. (p. 62)

MACHINES CAMS FASTER—By equipping a lathe with a special cross slide, track cams for a hay baler are now turned out at the rate of five to seven per hour. The machining operation, performed in the Auburn Works of International Harvester Co., hinges on a setup that involves a floating cross slide that is moved back and forth by the tool holder as it follows the groove between inner and outer cam surfaces of the fixture. (p. 65)

OLD BUT EFFECTIVE—Cold reducing operations for cold working metals, either for physical properties or for shape, anticipated hot rolling operations by some 150 years, it is pointed out. Because for many purposes cold rolled products effectively demonstrated its superiority, cold reducing equipment developments kept pace with advances made in hot rolling operations. As a result many types of equipment are available today for cold reducing sheets and strip. (p. 66)

RECENT DEVELOPMENTS IN

Titanium and Titanium Alloys

New high temperature titanium-boron steel and titanium base alloys are discussed in this second and concluding section of STEEL's current resumé

IN A recent report on research conducted by Titanium Alloy Division, National Lead Co., G. F. Comstock, assistant director of research, presented data on a new titanium-boron combination for steel which shows high temperature strength in ferritic as well as austenitic base alloys. According to Mr. Comstock, the steels which were investigated were melted in a 30-pound high-frequency induction furnace and thoroughly killed with aluminum before additions of boron and titanium were made in the ferroalloy form. The ingots were forged or rolled to bars at various shops without any special difficulty.

Steels containing neither boron nor titanium were also made for comparison purposes, as were steels containing columbium or zirconium instead of titanium. Also, some tests were made on titanium-boron steels containing certain other alloys. It was explained by Comstock that the forgeability of these steels containing boron to the extent usually found to produce hot-shortness is apparently related to the fact that sufficient titanium was present to combine with the carbon. Evidence is that it is not boron or a boride that promotes hot-shortness, but instead, a low-melting ternary iron-boron-carbon eutectic which melts at ordinary hot-working temperatures.

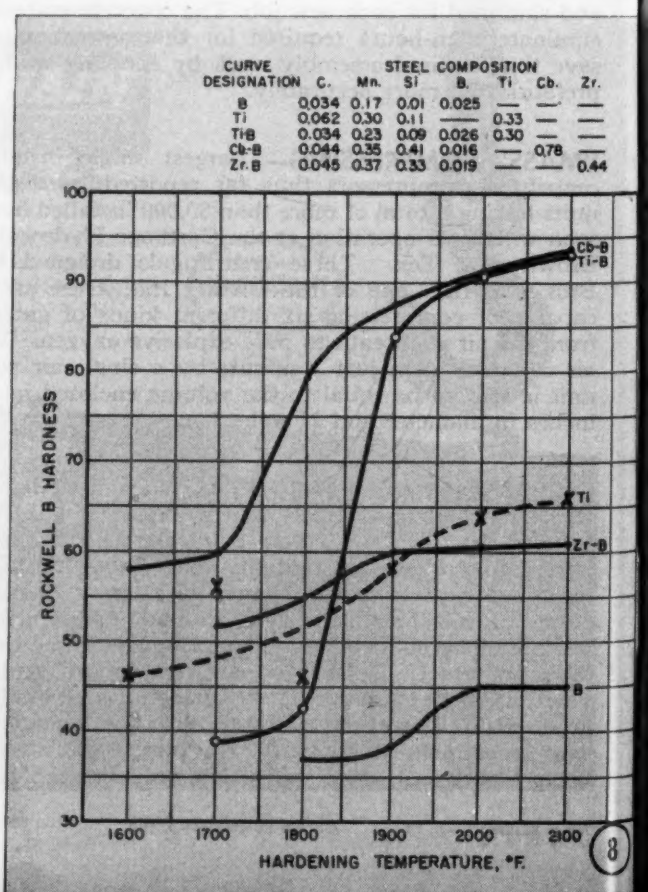
With the carbon fixed as titanium carbide, this fusible eutectic is not formed, and the steel can be hot-worked. It was pointed out that the few boron steels (without titanium) tested had to be forged very carefully at a lower temperature, and even then cracked quite a little.

Hardenability of Titanium-Boron Steels—Table III illustrates that a titanium-boron steel not only has a slightly greater quenched hardness than one without boron, but also a much greater hardness retention after slower rates of cooling, and equal resistance to tempering. These tests were made on small specimens about ⅞-inch in diameter and ⅜-inch thick.

Hardness of small specimens air-cooled from various temperatures is shown graphically in Fig. 8. This shows that either titanium or columbium, but not zirconium, can be used with boron in these ferritic steels to provide much greater hardness than is obtained by similar treatment with titanium or boron alone. Holding in excess of ½-hour at the hardening temperatures did not alter the values, and temperatures higher than 2100° F were of no consequence.

Fig. 9, based on data collected by National Lead, Titanium Division laboratories indicates the changes in hardness of several titanium-boron steels on tempering after the high temperature treatment and air cooling. There is generally a slight increase in hardness, above the value found after air-cooling from the high temperature, on tempering at 1000° or 1200° F, but this temper-hardening is negligible compared with the hardness developed on cooling from the high temperature.

Hardening of these ferritic, titanium-boron steels was described by Comstock as being similar in prin-



ciple to the hardening of carbon steels by the formation of martensite. Degree of hardening of the former is much less intense, and another difference is that (just as in the case of the increase in yield strength of low-alloy titanium steels by cooling from above 2000° F) the effect is not dependent on rapid quenching. Furthermore, a serious loss of hardness in the titanium-boron steel on tempering does not occur below about 1200° F, and at tempering temperatures between about 900 and 1200° F, there is a moderate temper hardening which even raises the hardness.

Tensile and Impact Properties—Room temperature properties of titanium-boron steels are given in Table IV. The strength is seen to be about doubled in the hardened and tempered condition, but with very little loss in ductility as represented by the reduction of area.

The notch sensitivity of the titanium-boron steels is rather high in the hardened and tempered condition of maximum hardness, but the notch-bar impact values can be improved either by hardening at a temperature below that giving the maximum hardness, or by tempering at a temperature sufficiently high to decrease the hardness slightly. This is shown by results compiled by Comstock in typical tests which are given in Table V.

It can be noted from Table V that Izod impact values of about 15 or more can be obtained in these steels, hardened at 2100° F, if they are tempered at 1200° F with a slight sacrifice of the maximum hardness. With further over-tempering, there is a great increase in the impact value with only a slight further drop in hardness; but with underhardening the decrease in hardness is large like the increase in notch-toughness. It was emphasized by Comstock that the notch sensitivity of these hardened titanium-boron steels seems to be a property of the ferrite and is not related to any change in grain size or microstructure that has thus far been discovered.

According to Comstock, the addition of other alloys, such as 1.6 per cent manganese, 2 per cent nickel, or up to 4.8 per cent chromium has been tried in an effort to improve the notch toughness of the titanium-boron steels, heat treated to maximum hardness, but without any important degree of success. While the addition of nickel may be slightly beneficial in this respect, manganese and chromium seem to be detrimental.

According to data reported by Comstock, the rupture strength of titanium-boron steels, quenched or air-cooled from about 2100° F and tempered at 1000 to 1200° F, under sustained loading at 1000 or 1100° F, is greatly superior to that of other ferritic steels under the same conditions, and is comparable to that of austenitic steels. If the heat treatment is such as to give somewhat lower hardness and high temperature rupture strength than the maximum attainable for the particular titanium-boron steel, notch toughness represented by about 15 foot-pounds Izod or more may be provided, together with rupture strength much superior to that of other ferritic steels such as those containing molybdenum. Test results on time of rupture for certain titanium-molybdenum steels in relation to the heat-treatment, composition, hardness, and impact values are given in Table VI.

Titanium-Boron Steel with Chromium—Comstock pointed out that the method of improving the high-temperature rupture strength of ferritic steels by adding 0.01 to 0.03 per cent boron and over six times as much titanium as carbon, hardening by air-cooling or quenching from above 2000° F, and tempering at 1000 to 1200° F, is applicable to oxidation-resistant steels containing 2 to 6 per cent chromium. It was also pointed out that experiments have shown possibilities for improving the high temperature strength of high-alloy steels, at least at moderately high temperatures, by the use of boron with titanium or columbium, and suitable heat treatment.

Titanium-Boron Steel with Molybdenum — Since molybdenum is the alloy addition now generally used to promote high-temperature strength in ferritic or pearlitic steels, and the titanium-boron combination was found to have such a remarkable effect in the same direction after a suitable heat treatment, Comstock described work that was carried out to prepare two steels containing both molybdenum and titanium, plus boron, to see if the effects of both additions could be superimposed upon each other. These steels were made in the form of two ingots poured from the same induction-furnace heat, with a little extra addition of molybdenum made after pouring the first

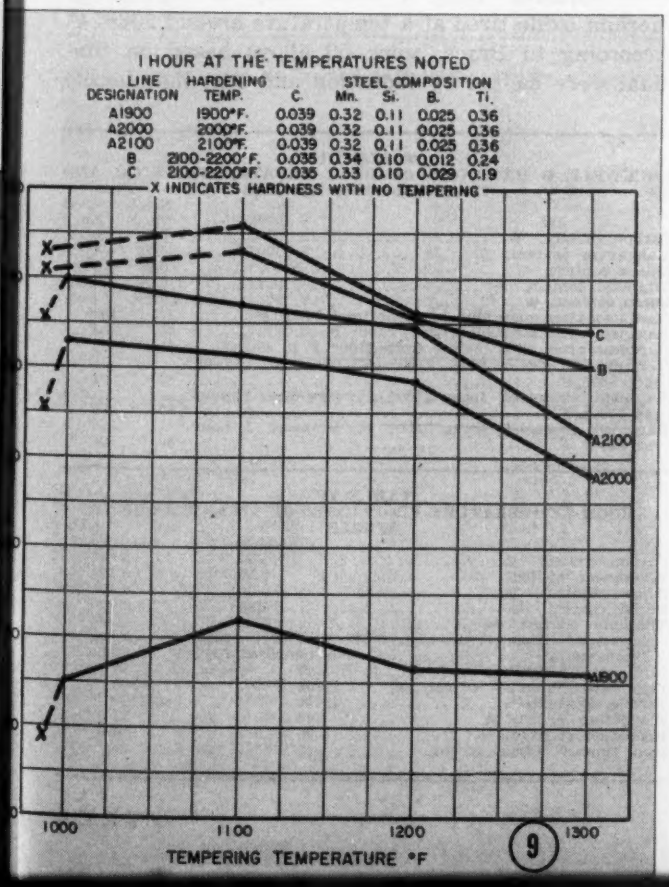
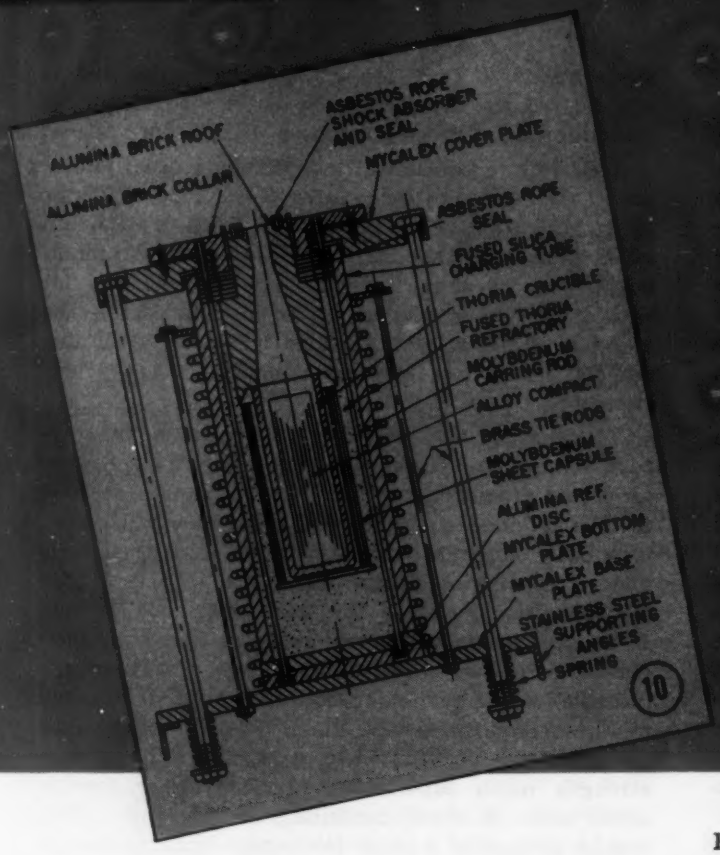
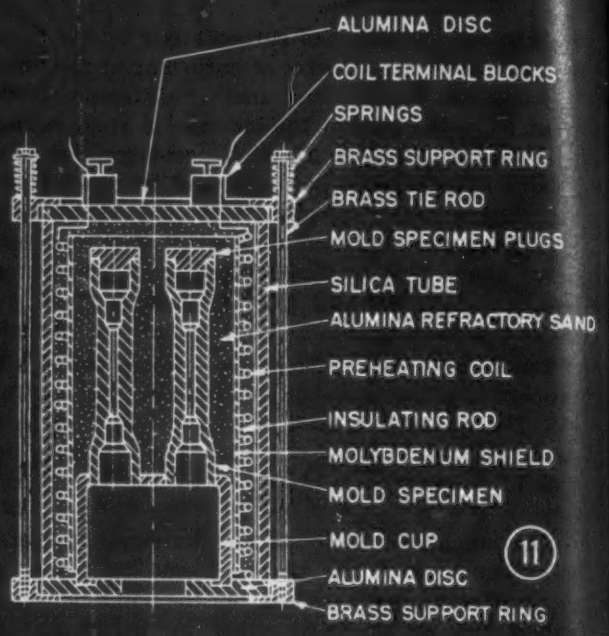


Fig. 8—Hardness of small specimens heated ½-hour at temperatures noted and air-cooled

Fig. 9—Hardness of small specimens after air-cooling from temperatures between 1900 and 2200° F, and tempering 1 hour at the temperatures noted





ingot. The analyses of the ingots was as given below:

	First Ingot	Second Ingot
Carbon	0.07	0.07
Manganese	0.51	
Silicon	0.41	
Chromium	2.2	
Molybdenum	0.51	1.05
Boron	0.02	0.02
Titanium	0.32	0.33

Sections of forged bars from these ingots were heated for an hour at 2100° F, air cooled, and tempered 2 hours at 1100° F. After machining, specimens were tested to determine the time for rupture at 1100° F and 30,000 psi. The test of the 0.05 per cent molybdenum steel, according to Comstock, was terminated by overheating due to failure of the temperature control at 1022 hours, but the specimen of the 1 per cent molybdenum steel was removed unbroken after 3312 hours with 2 per cent elongation. As a result of these tests, Comstock pointed out the possibility of obtaining still greater rupture strength at 1100° F by using molybdenum with titanium and boron in heat treated low-alloy steel.

Resistance to Graphitization—Tests were reported which showed that the low carbon titanium boron steels are not subject to graphitization in 5000 hours at 1100° F, even though fully killed with aluminum. In carrying out the study, specimens of low-carbon steels that were known to be subject to graphitization were tested, along with the titanium-boron steel specimens, to insure that the conditions were correct for graphitizing, but were removed when graphite was found in them.

Titanium-Rich Alloys—The recent titanium symposium sponsored by the Office of Naval Research featured discussions on the possibilities for development of titanium-rich alloys for applications where the pure metal is not particularly suited. One report from the Westinghouse Research Laboratories by P. H. Brace discussed the extensive work carried out to test the high temperature properties of titanium alloys. According to Brace, the program was primarily aimed at improving the high-temperature strength and high-temperature oxidation characteristics of pure titanium by alloying procedures.

Some of the problems involved in working with titanium alloys involving temperatures as high as 1800° C were discussed by Brace before the symposium. Concerning work carried out on refractories for the operation, it was brought out that best results were obtained using a dense body of high-purity thorium oxide fired at a temperature around 2000° C. According to Brace, some 50 alloys based on titanium were melted by induction and cast into tensile

TABLE III
ROCKWELL B HARDNESS OF HEAT TREATED TITANIUM AND TITANIUM-BORON STEELS

	Steel No. 1	Steel No. 2
Carbon content, %	0.03	0.03
Manganese content, %	0.22	0.23
Silicon content, %	0.09	0.09
Titanium content, %	0.28	0.30
Boron content, %	None	0.03
Hardness after quenching in water from 2100° F	94	101
Hardness after air-cooling from 2100° F	64	93
Hardness after slow cooling from 2100° F in silocal	44	86
Hardness air-cooled from 2100° F, tempered 1 hour at 800° F	69	91
Hardness air-cooled from 2100° F, tempered 1 hour at 1000° F	65	95
Hardness air-cooled from 2100° F, tempered 1 hour at 1200° F	66	90

TABLE IV
ROOM-TEMPERATURE PROPERTIES OF TITANIUM-BORON STEELS

	Steel No. 2		Steel No. 3
Carbon content, %	0.03		0.04
Manganese content, %	0.23		0.32
Silicon content, %	0.09		0.11
Boron content, %	0.03		0.02
Titanium content, %	0.30		0.36
Air-cooled from	1600° F	1800° F	2100° F
Tempered at	Not tempered	1000° F	1200° F
Rockwell B Hardness	40	46	85
Yield Strength, 0.2% Offset, psi	31000	..	70300
Tensile Strength	44700	..	84400
Elongation in 2", %	44.0	..	21.0
Reduction of Area, %	85.7	..	79.0
Izod Impact Value, ft.-lbs.	..	115	24

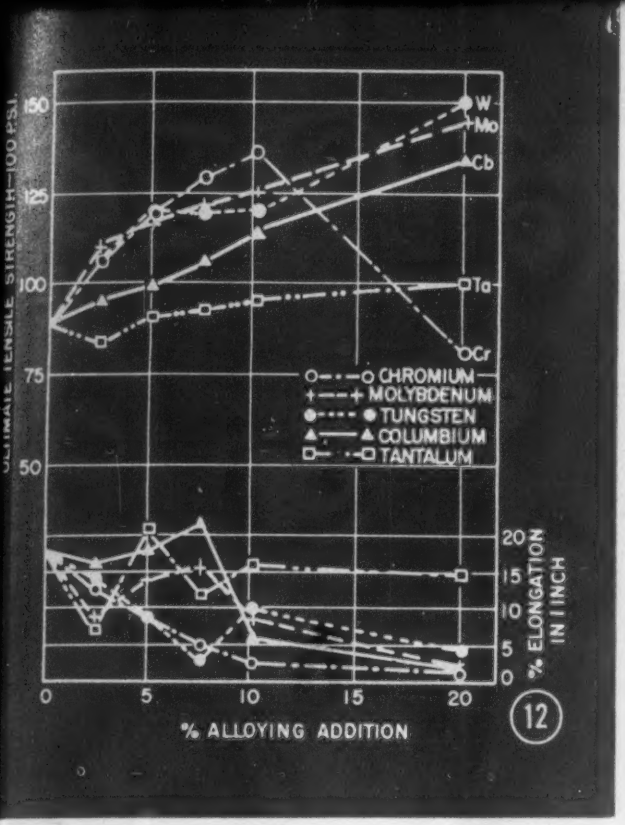


Fig. 10—Crucible assembly for vacuum casting furnace used at Westinghouse laboratories for titanium alloys

Fig. 11—Mold setup at Westinghouse laboratories for use with vacuum casting furnace

Fig. 12—Effect of chromium, molybdenum, tungsten, columbium and tantalum on the tensile strength and ductility of titanium. Alloys prepared by powder metallurgy methods at Battelle Memorial Institute. Condition —hot rolled at 1650° F and furnace-cooled

test specimens in a novel type of vacuum casting furnace, the crucible assembly for which is shown in Fig. 10. Fig. 11 shows the mold setup.

An important adjunct to the melting system was a "thermosiphon" purification system for providing a supply of high-purity argon for use as a melting atmosphere. In essence, this system consisted of two vertical stainless steel tubes connected, top and bottom, by pipes so that the gas to be purified could circulate up and through one tube (heated) and down the other under the aerostatic pressure difference between the gas in the hot tube and that in the cold. In the hot tube, calcium metal, in the form of chips, supported on a series of wire-mesh trays acts as a "getter" for any reactive gases in the argon. The argon is held under a pressure of approximately 50 psi while the maximum temperature of the column of calcium chips is maintained around 700° C.

Vacuum Melting Routine — The vacuum melting routine used by Brace in preparation of the titanium alloys comprised weighing and assembly in the crucible of the components of the charge, mounting the crucible and the charge in a silica tube container and mounting within the inductor coil, assembling the mold components, evacuating the melting chamber, out-gassing the mold, preliminary heating and out-gassing the charge, heating, fusion, and adjusting the temperature of the melt and finally casting.

Tensile test data on the alloys produced were obtained at 1750° F by means of a screw-driven autographic tensile test machine. At 1750° F, the best 0.2 per cent yield strengths found were shown by titanium-chromium base alloys containing molybdenum and tungsten in equiatomic ratios. According to Brace, the results he has obtained to date indicate that the use of tungsten and molybdenum together gives more favorable properties than are obtained when either metal is used alone.

Titanium-Base Alloys Studied — Howard C. Cross reported at the Naval (*Please turn to Page 92*)

TABLE V

RELATION OF NOTCH-BAR IZOD IMPACT VALUES TO HARDNESS OF HEAT TREATED TITANIUM-BORON STEELS.

Steel No.		2		3		4		5	
Carbon content, %		0.03		0.04		0.03		0.03	
Manganese content, %		0.23		0.32		0.34		0.33	
Silicon content, %		0.09		0.11		0.10		0.10	
Boron content, %		0.03		0.02		0.01		0.03	
Titanium content, %		0.30		0.36		0.24		0.19	
Air-cooled From	Tempered at	Rockwell B	Izod Ft.-Lbs.	Rockwell B	Izod Ft.-Lbs.	Rockwell B	Izod Ft.-Lbs.	Rockwell B	Izod Ft.-Lbs.
1800° F.	1000° F.	46	115	..	..	..	..	..	..
1900° F.	1000° F.	84	17	45	119	..	..	..	..
2000° F.	1000° F.	92	6	83	21	..	..	..	..
2100° F.	1000° F.	92	5	90	10	..	..	..	..
2100° F.	1100° F.	..	..	87	12	93	4	96	5
2100° F.	1200° F.	..	..	85	24	85	15	85	15
2100° F.	1300° F.	..	..	73	151	..	..	..	..
2200° F.	1300° F.	..	..	..	..	80	146	84	154

TABLE VI

RELATION OF TIME FOR RUPTURE AT 1100° F. AND 30,000 lbs./sq. in. TO COMPOSITION, HEAT TREATMENT, HARDNESS AND NOTCH TOUGHNESS.

(NATIONAL LEAD CO., TITANIUM DIV. LABORATORIES)

Type of Steel	Air-Cooled from	Temperd at	Hours to Rupture	Elongation of Ruptured Specimen	Rockwell B Hardness	Izod Value Ft. Lbs.
Carbon-Molybdenum	1650° F.		Less than 1			
0.5% Mo plus Ti (Ti/C — 4.3)	1650° F.	1200° F.	13			
0.06% C, 0.5% Mo, 0.5% Ti	2100° F.	1000° F.	48(25,000) (Psi)	35%		
0.03% C, 0.3% Ti, 0.026% B	2100° F.	1000° F.	490	20%	92	5
0.03% C, 0.3% Ti, 0.026% B	1900° F.	1000° F.	Less than 1	35%	84	17
0.03% C, NoTi, 0.025% B	2100° F.	1000° F.	Less htan 1	80%	40	
0.03% C, 0.24% Ti, 0.012% B	2100° F.	1200° F.	240	21%	85	15
0.04% C, 0.36% Ti, 0.025% B	2100° F.	1200° F.	119	19%	85	24
0.04% C, 0.36% Ti, 0.025% B	2100° F.	1100° F.	856	22%	87	12
0.04% C, 1.63% Mn, 0.37% Ti, 0.030% B	2000° F.	1200° F.	2	30%	82	168
0.03% C, 2% Ni, 0.36% Ti, 0.025% B	2100° F.	1100° F.	124	25%	94	21
0.03% C, 2% Ni, 0.36% Ti, 0.025% B	1900° F.	1100° F.	Less than 1	42%	83	168
0.03% C, 0.19% Ti, 0.029% B	2000° F.	1200° F.	244	25%	84	20
0.03% C, 0.19% Ti, 0.029% B	2100° F.	1200° F.	702	16%	85	15
0.04% C, 0.66% Cb, no B	2100° F.	1200° F.	238	28.5%	88	85
0.04% C, 0.78% Cb, 0.016% B	2100° F.	1200° F.	Over 400	Unbroken	92	15
0.04% C, 0.44% Zr, 0.019% B	2100° F.	1000° F.	Less than 1	51%	60	

Fig. 1—General view of 12-station buffing machine, with exhaust system from each of the eight buffing heads removed. Note universal fixtures carrying each motor and wheel unit, independent of the indexing table

Fig. 2—Close-up of formed hub cap in small punch press for embossing "Mercury" name in the face

Fig. 3—These are Ford hub caps in position on a 15-station polishing machine which prepares outer surface for subsequent nickel plating

BUFFING of plated hub caps

Formerly performed manually by holding parts against buffing wheels of conventional stand-type machines, this operation is now a completely automatic setup at Ford. Currently some 600 caps per hour are made

LAST year well over 700,000 Ford and Mercury passenger cars were built and, at four to the car, this entailed manufacture of close to three million hub caps, if service requirements are taken into consideration. Obviously such a production turnout calls for a high degree of mechanization and automaticity in the sequence of operations at the hub cap department in the "spring and upset" building of the Rouge plant, Dearborn, Mich. This is particularly true in respect to polishing and buffing operations.

Caps are formed from a single piece of cold-rolled low-carbon steel, 0.029 to 0.030-inch thick. Circular blanks are punched from coiled strip in presses, the Ford blank being 12¾ inches diameter and the Mercury 14½ inches. Blanks then are formed for the turndown at the edge and embossing of the name, Fig. 2, then trimmed and flanged in one operation, and finally spun to form the curl at the edge which holds them in place after being snapped over three projecting lugs on the car wheel.

Following press and spinning operations the caps are placed on an overhead chain conveyor and transferred to 15-station Sommer & Adams automatic polishing machines, Fig. 3, located on a balcony floor in the building. These are rotary units, with rotating spindles indexing under a series of polishing heads. After passing through this sequence parts are placed on a conveyor where they are transferred to cleaning and plating tanks and plated with 0.0019-inch of nickel.

Automatic Operation—To obtain the requisite brilliant luster on plated caps, a careful buffing sequence is essential. Formerly done by hand, holding the parts against buffing wheels of conventional stand-type machines, this operation now is entirely automatic with the installation of three Acme 12-station indexing machines, comprising a 10-foot 2-ton turntable around the periphery of which are mounted 12 equispaced vertical spindles carrying chucks on which hub caps are mounted and locked in a flat position.

Independent of the turntable are eight Acme individual adjustable floating-head buffing lathes equipped with 10-hp motors. General view of one of the machines is shown in Fig. 1. Each buffing head, being universal, is adjusted to the proper angle to accomplish its part of the operation. Buffing includes what are termed "cutting" and "color" actions. Thus two heads operate on the side of the cap for cutting, one for color; while four are for cutting the top and one for color. By cutting is meant removal of the thin outer layer of more or less porous and dull-appearing nickel; the coloring buffs bring out the high degree of reflectivity desired. Color buffs are of course softer than cutting buffs. Each head or wheel is built up of anywhere from 3 to 15 standard buffing disks clamped together on the driving spindle. The wheels operate at 1850 rpm and are driven by multiple V-belts from the motor which is an integral part of the head carried on collars on the slotted vertical posts of each stand. Cranks are provided to actuate the gearing changing the angle of the head and to raise or lower the head which travels on a screw inside the column.

Compound Sprayed On Work—A rouge buffing compound is used on each buffing head and, although at the start of operations a stick compound was applied manually, a system of pumps, piping and air guns has been installed to deliver liquid compound to each wheel where it meets the work. The guns are tripped by dogs on the indexing table, in such a way that compound is sprayed on the wheel only while it is in contact with the work. A 2½-inch piping system serves the three machines, with compound pumped to the gun outlets from a central reservoir.

The circular table carrying the chuck spindles weighs approximately 2 tons and is capable of indexing over 1000 times per hour. This is accomplished by a drive mechanism located under the table, including a motor driving, through a gear reduction unit, a 92-inch Geneva indexing plate. As currently operated an indexing time of approximately 5 seconds is being used, resulting in a production rate of about 600 caps per hour, figuring 1 second for the table to complete each indexing.

Supplementing the table drive is a separate chuck spindle drive unit which operates a double roller chain in a track underneath the table, meshing with sprockets on each spindle so that they are turned at a speed of perhaps 25 rpm at each work station. At the loading and unloading stations, the chain is diverted from the spindle gears, leaving the chuck spindle idle for loading and unloading. There are four such "idlers", although actually only two would be needed for removing the finished caps and loading unbuffed pieces.

Caps are locked tightly to the

By A. H. ALLEN
Detroit Editor, STEEL

spindle heads by cam-operated automatic expansion chucks having three projecting fingers disposed around the periphery of the head. These fingers are held in the outward or locked position by a cam rail underneath the table, which is interrupted at the idler stations to release pressure on the locking fingers and permit removal of parts.

Independent Control—At the loading station, well shielded from the work stations, the operator merely has to remove the buffed caps from the idling spindle, place them on the conveyor behind him and position a new cap on the spindle after it has indexed once. At his right is a convenient switch panel, as shown in Fig. 4, provided with button switches controlling each of the eight buffing heads independently, as well as the table drive, spindle drive and master control for all power.

A considerable amount of dust arises in the buffing operation, and each wheel is shrouded on its upper half by an exhaust hood, from which ducts lead to a central vertical exhaust chamber located at the center of the table. Exhaust air is led into the top of this chamber and down over a series of baffles to the base and then up an inner duct to the main exhaust line which travels to roof outlets. Most of the dust in the exhaust is entrapped by the chamber baffles and falls to the bottom. At the end of each shift the accumulated material is cleaned out and hauled away. Location of the machines on a balcony of the building results in a shorter exhaust line to roof outlets than from the ground floor, thus giving more positive exhaust action, since fans are installed at the outlet points.

After buffing, hub caps are replaced on an overhead chain conveyor, the same one which brings the unbuffed pieces to the machines, and transferred to a chrome plating department where they are racked four to a fixture, as shown in Fig. 5, and given a flash chrome plate. Following washing and inspection the hub caps are then ready for shipment to assembly lines.

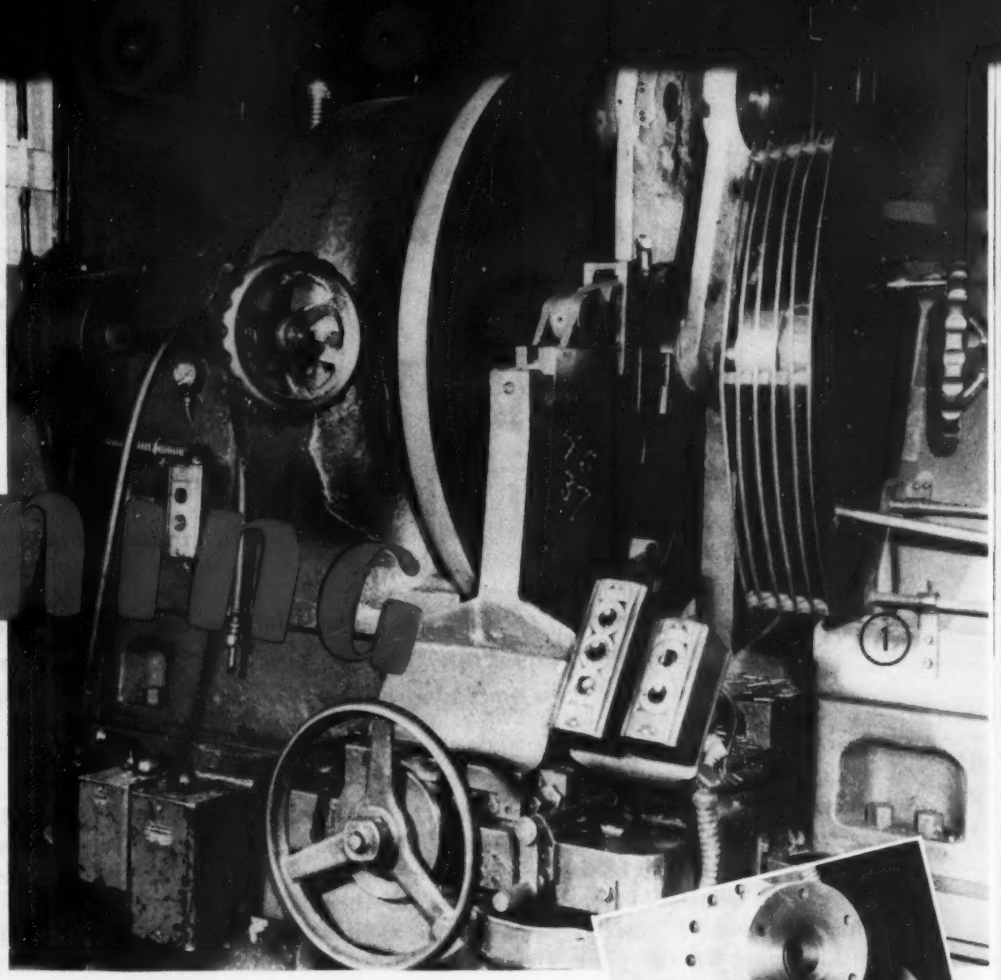
Fig. 4—Overhead view showing how hub cap is positioned on spindle. At operator's right is master control panel. Door by operator's knee provides access to table and spindle drive mechanisms. Conveyor rack shown at left

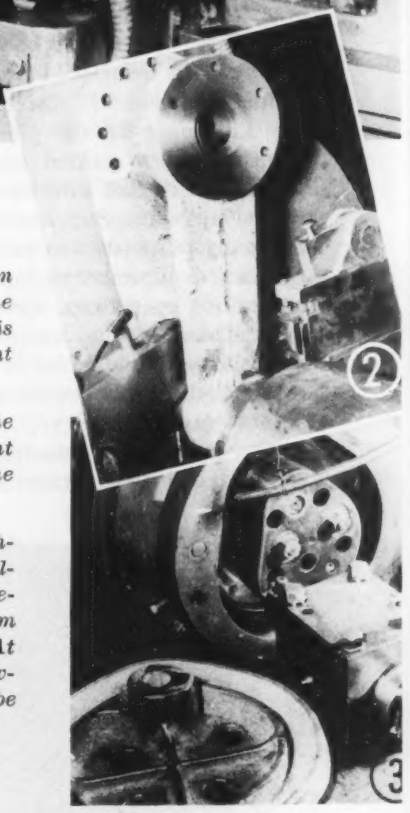
Fig. 5—Four to a rack, hub caps move into chrome plating solution after they have been buffed and cleaned. Plating capacity is 1400 per hour

By HERBERT CHASE

UNUSUAL TURNING JOBS

. . . performed on lathes, using proper tool, mounting and suitable fixture





TWO rather unusual lathe jobs are performed at the Auburn Works of International Harvester Co. in fabricating components for hay balers. One of these is machining a track cam of irregular contour produced as a malleable iron casting. The recessed track of somewhat ovoid outline is cored, but about 1/16-inch of metal has to be cut from each side of the groove. Fairly close dimensions must be held on the inner contour, but the outer contour need not be held closely as long as it provides adequate clearance for the cam follower.

In this instance, a LeBlond lathe is provided with a floating cross slide which is moved back and forth by the tool holder as it follows the groove between inner and outer cam surfaces of the fixture. The tool post is attached rigidly to the cross slide but contains a bearing in which the tool holder oscillates. Fig. 3 shows the tool backed out and, in the left foreground, a casting ready for machining, another being in the fixture attached to the spindle. High speed steel tool is used, ground to the width of the track. The outer end of the holder is not cylindrical but has cam-shaped faces that bear on the fixture cams.

As the fixture and work rotate at slow speed (about 17 rpm) the tool holder follows the fixture cams. This causes the cross slide, with the tool holder and post, to reciprocate and also causes the tool holder and the tool to rock about the holder axis. This rocking occurs when the cross slide changes its direction of motion.

The tool is fed in about 0.009-inch per revolution of the work and generates surfaces at each side of the cam track. With this setup, from five to seven cam tracks are cut per hour or several times as many as were formerly machined. Water fed into the groove as a coolant helps to wash chips from the track.

Fig. 1 — Large cast iron crank setup in Wicks lathe in which the crankpin is turned and the adjacent cheeks are faced

Fig. 2—Finish turning the crankpin. Backed off at right is the holder for tools on the rear slide

Fig. 3—Cutting tool withdrawn with its rocking holder out of the groove between inner and outer cam surfaces of the fixture. At left is a rough casting, showing recessed groove to be finished

Cranks employed in the hay baler are heavy gray iron castings. A Wicks lathe, Fig. 1, is employed to turn the crank pin, face its cheeks and turn the fillets that join pin to cheeks. Drive is by a pin on a face plate, entering a hole previously bored in the crank; but the work is located on centers previously drilled.

Roughing cuts are made by two tools that feed in from the back and one from the front. Rear tools face the cheeks and turn the fillets. The front roughing tool turns the pin. Rear tool holder is shown clearly, when backed off, in Fig. 3, which also shows the front tool holder ready for the finish cut.

The front finishing tool (*Please turn to Page* 94)

Production of

HOT and COLD-ROLLED Strip and Sheets

By CHARLES L. McGRANAHAN
Assistant General Superintendent, Pittsburgh Works
Jones & Laughlin Steel Corp.
Pittsburgh

In this fourth section, the author defines and discusses cold-rolled carbon steel sheets and strip. He also describes the various types of cold-rolling mills employed in the production of the product today

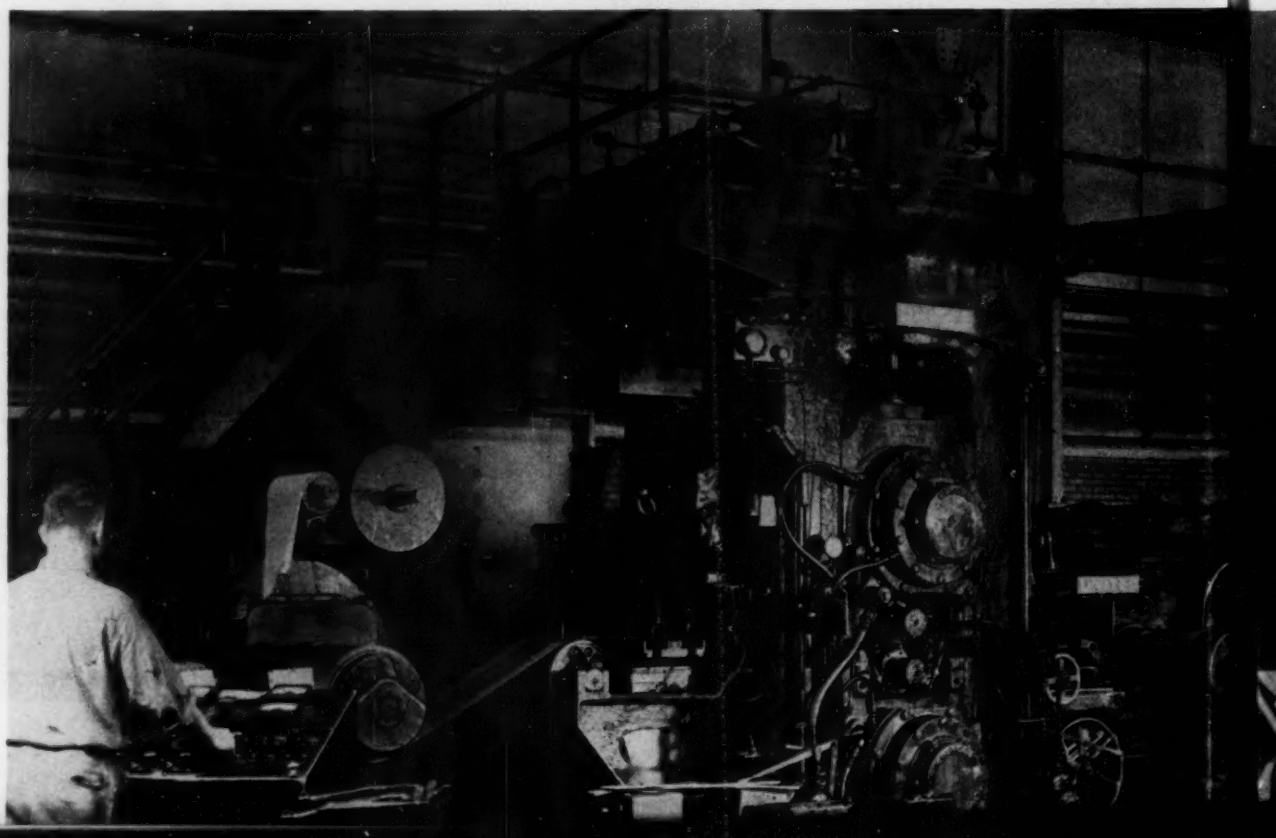
PART IV

COLD-REDUCING operations for the cold working of metals, either for physical properties or for shape, anticipated hot rolling operations by some 150 years, having been mentioned as early as 1495 for the cold rolling of lead. In later years it was applied to the flattening of tin plate and in the early nineteenth century gained extensive application in the production of flat wire for reeds, hoops for skirts and flat tying wire. Superiority of a cold rolled product for many purposes was quickly demonstrated and cold reducing equipment kept pace with advances made in hot rolling operations. Cold-rolled sheets as to quality are defined by the American Iron & Steel Institute as follows: Cold-rolled sheets commercial quality, cold-rolled sheets surface quality, and cold-rolled sheets drawing quality.

The processing schedule of cold-rolled sheets is so arranged that either a dull (satin finish) or a lustrous (bright finish) surface is produced, which surface is superior to that of a hot-rolled-pickled finish. The treatment consists in the cold reduction of a pickled sheet or strip (coil) at a temperature below the scaling point, then followed by annealing, cold rolling (skin passing or temper rolling) and roller leveling. The product may be shipped in cut lengths or in coil form and the processing through temper mills and cutting-to-length shear is varied to accommodate the form in which the material is annealed.

Each class of cold-rolled sheets is graded as to surface condition as cold-rolled primes or cold-rolled sheets and may be so ordered, except that in coil form, sheets may be ordered as mill-run grade only.

Fig. 30—A modern four-high reversing mill such as is used for production of narrow strip, high tensile and stainless steels. United Engineering photo



FUNDAMENTALS OF STEELMAKING

NUMBER **9** OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

Cold-rolled sheets are sheets which, as furnished, may contain surface imperfections of such a character that they may be used for identified parts with a reasonable amount of metal finishing by the purchaser. They are supplied in coils or cut lengths.

Cold-rolled primes are sheets inspected to meet specific surface requirements without any required metal finishing by the purchaser to remove surface imperfections other than those caused by his handling and fabrication. They are supplied in cut lengths only.

Cold-rolled commercial quality sheets are suitable for exposed parts requiring a good surface. This material is produced with a dull surface texture suitable for the application of paints, enamels or lacquers, however, they are not guaranteed for surface uniformity after electroplating. They are produced primarily for use in fabricating identified parts and when so used are processed so as to be free from surface disturbances known as fluting or stretcher-straining during fabrication, provided the sheets are roller-leveled by the user immediately before fabrication.

Sheets of cold-rolled commercial quality should be capable of withstanding the following bend tests at room temperature: For sheets with carbon content not exceeding 0.15 per cent, a test specimen should withstand being bent flat on itself in any direction; for sheets with a carbon content of 0.15 per cent but not exceeding 0.25 per cent, a test specimen should withstand being bent 180 degrees in any direction around a mandrel having a thickness equal to that of the specimen. It is the industry's custom not to guarantee to satisfy any further test requirements.

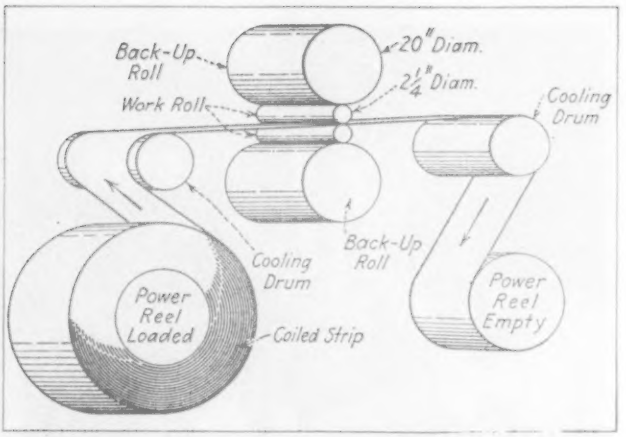


Fig. 31—Sketch showing roll diameters, cooling drums and power reels of a Steckel-type cold reducing mill

Cold-rolled commercial quality sheets are ordinarily produced from rimmed-steel, capped-steel or semi-killed steel, at the producer's option, with only sufficient discard being taken to remove visible piping. Due to segregation inherent in the solidification of this type of steel it does not possess a high degree of uniformity in chemical composition and mechanical properties. Consequently, while sheets of this quality may be suitable for moderate drawing requirements, they are not guaranteed against breakage except that caused by pipe or open-type lamination.

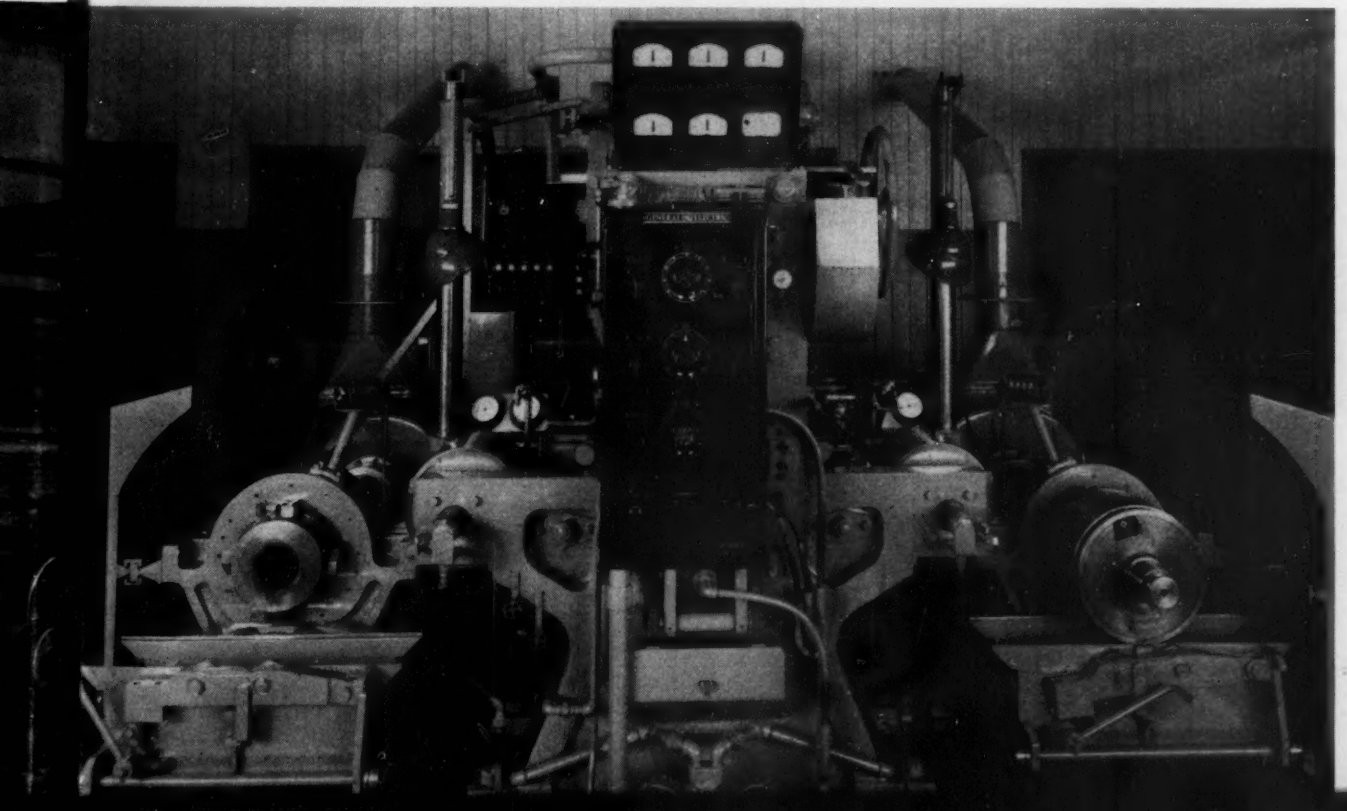


Fig. 32—Front view of the CMP mill showing reels, cooling drums and control panel. Cold Metal Products photo

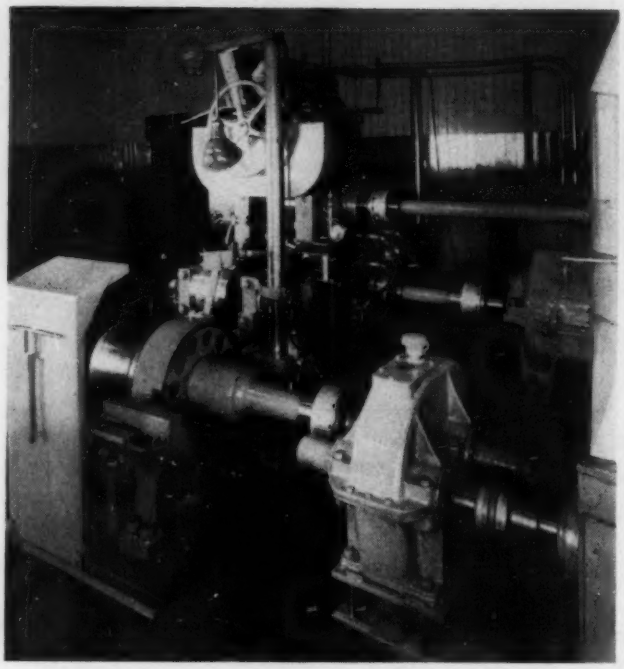


Fig. 33—Back view of the CMP mill showing spindles for driving top and bottom back-up rolls, also drive for one of the tension reels. Cold Metal Products photo

Individual sheets are customarily marked "Commercial Quality" or "CQ".

Cold-rolled lustre finish sheets are produced on ground and polished cold rolls and possess a surface finish more lustrous than cold-rolled commercial quality. These sheets are particularly applicable for parts requiring high finish combined with simple forming. They are not guaranteed to retain their lustre in fabrication and must be polished and buffed to make them suitable for plating.

Cold-rolled drawing quality sheets are suitable for exposed parts requiring a good surface. They are produced with a dull-surface texture, suitable for the application of various organic finishes such as paints, enamels, lacquers, and are particularly suitable for parts which are severely deformed and require a good surface finish. It is the industry's custom not to guarantee drawing quality sheets for surface uniformity after electroplating.

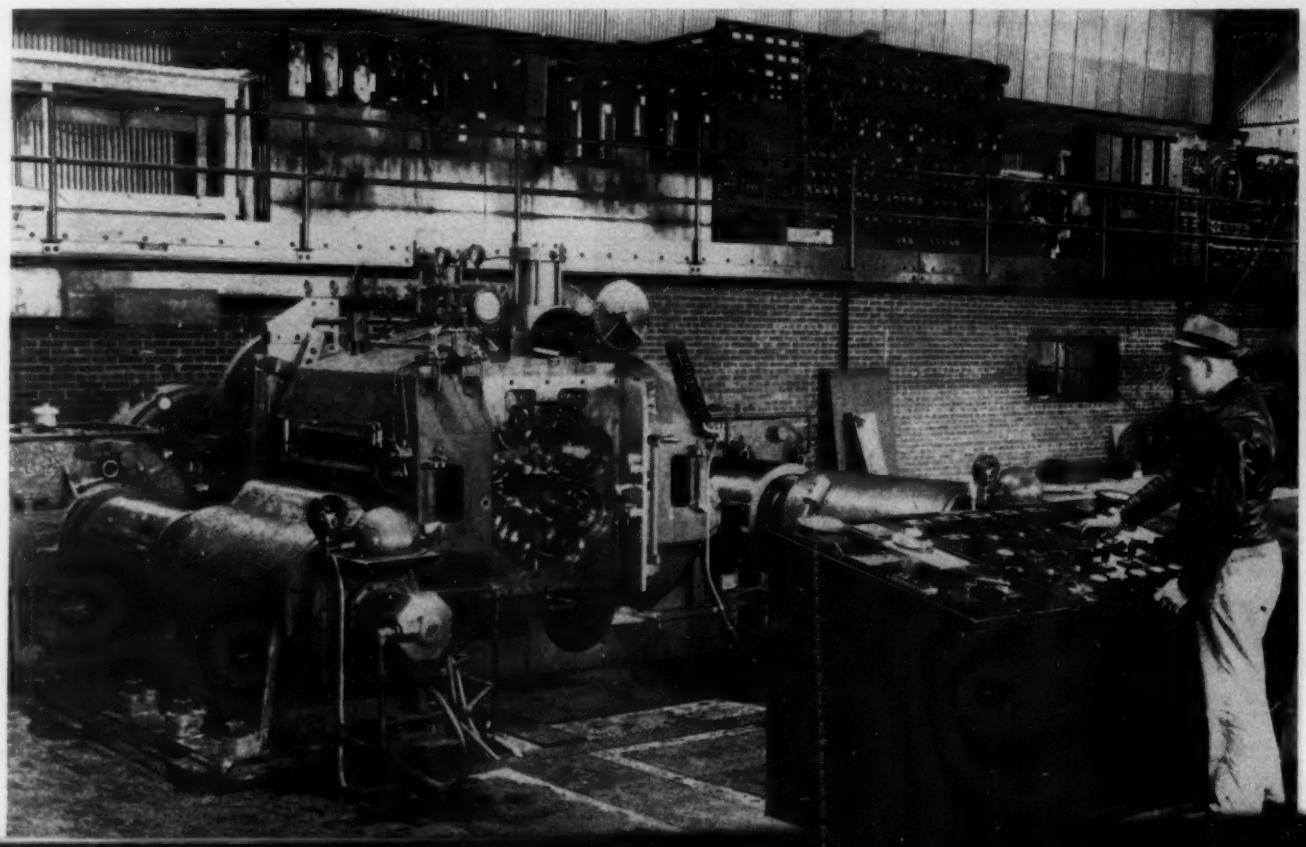
Production of cold-rolled drawing quality sheets with the best and most uniform drawing properties attainable from carbon steel requires proper selection of raw materials, use of special killed-steel or specially selected rimmed-steel, and exacting control of the processing operations. This type sheet should produce within properly established breakage allowances, identified parts too difficult for the drawing properties of any other quality classification. They should be free from surface disturbances in fabrication when properly roller-leveled by the user, immediately before fabrication.

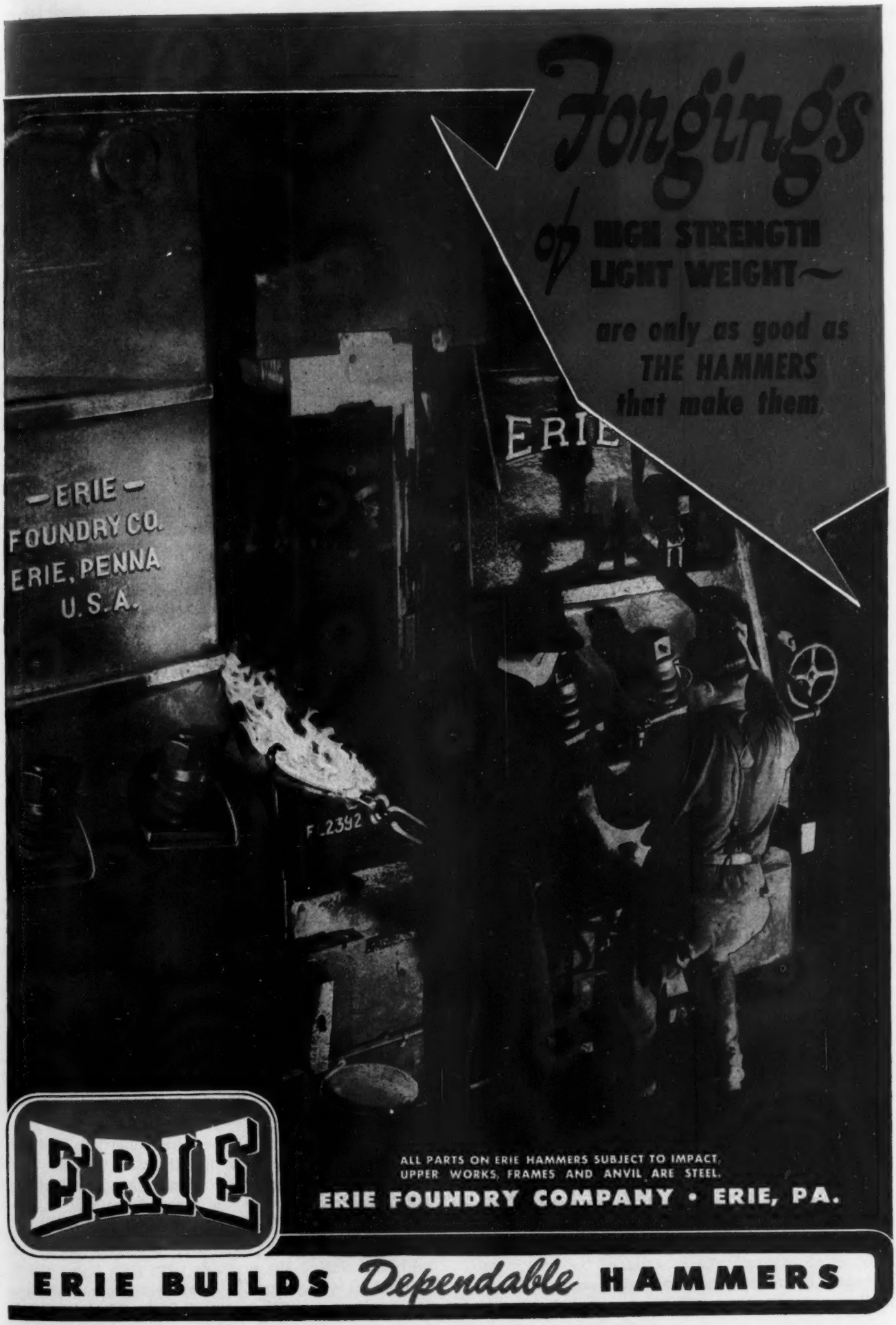
Individual sheets are customarily marked "Drawing Quality" or "DQ".

Cold-reduced sheets and strip may be produced upon a wide variety of equipment consisting of either two-high, three-high, four-high, or cluster-type of mill, the latter consisting of a multiplicity of rolls arranged in a special grouping. Stands may be arranged singly or in tandem, however, the most practical and economical layouts from a production and cost standpoint are as follows, the determining factor being the finished gage: 1—Single stand reversing mill, 2—three stand continuous tandem mill, 3—four stand continuous tandem mill, and 4—five stand continuous tandem mill.

Cold-reducing mills of the single stand reversing type consist of a single stand of rolls with tension

Fig. 34—Wide Sendzimir mill for the production of wide stainless strip. Note compact and rugged construction of this mill housing. Armzen Co. photo

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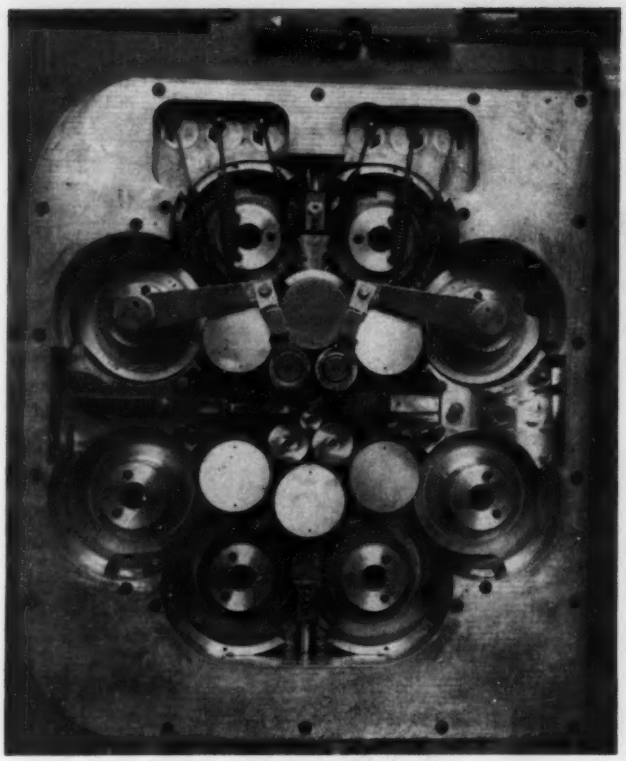


Fig. 35—Close-up view of a Sendzimir mill showing work rolls, first and second sets of intermediate and caster rolls. Note racks for adjusting the eccentric shafts on the two top and two bottom sets of clusters. Sprays for handling coolant can be seen on either side of the work rolls above and below the outside groups of casters. Armzen Co. photo

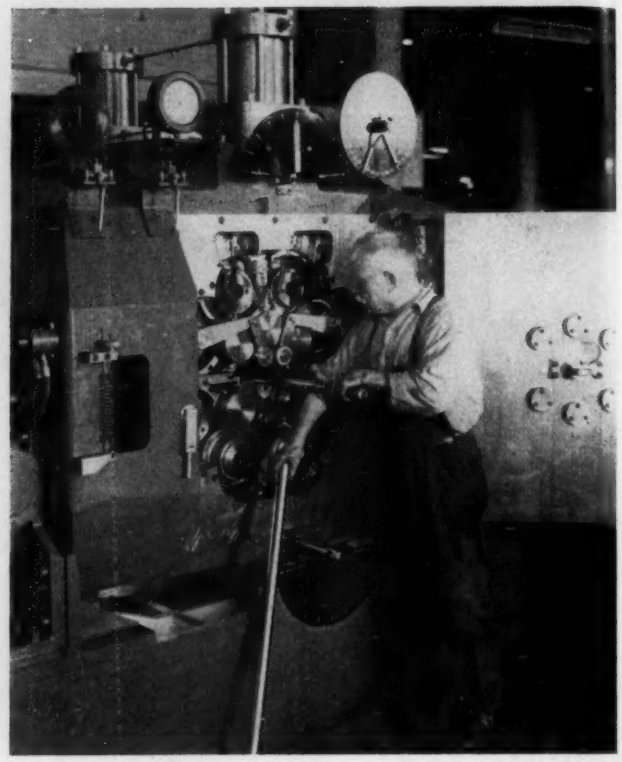


Fig. 36—Changing working rolls on a Sendzimir mill. Roll size is 37 inches long by 1 7/16 inches in diameter with 9-inch diameter casters. Roll opening indicators are seen above and below the access door opening. Armzen Co. photo

reels located on both sides of the mill, Fig. 30. The mill is usually of the four-high or cluster type, however, considerable tonnage of narrow strip is still produced upon rugged two-high mills.

When the installation utilizes a conventional two-high, four-high or cluster mill, the working rolls and reels are driven by independent motors equipped with Ward-Leonard (variable voltage) control which permits close synchronization of the various units. The working rolls range from one-third to one-half the diameter of backing-up rolls. A reduction is taken on the entry end of the pickled coil which is gripped in the jaws of the tension reel and cold reduced to within a few inches of the coil's tail end. The mill is then reversed and the heavy end gripped in the tension reel on the mill's entry side and the operation repeated. Alternate rolling in opposite directions under proper roll pressure and tension finally bring about the desired percentage of reduction in the pickled coil or band as it is sometimes called. Considerable heat is generated in the strip and in the working rolls during the cold reducing operation and this is dissipated by a coolant usually consisting of a solution of soluble oil and water. An extensive system of heaters and coolers is provided for the circulation of the coolant. In spite of the heavy construction of modern reducing mills some deflection of the working rolls may take place and this is compensated for by making at least one working roll diameter a few thousandths larger in the middle than at the ends.

It has been common knowledge for many years that heavy reductions could be taken with working rolls of quite small diameter as compared to the backing-up roll, however, the problem of a suitable drive was not solved until the early 1920's with the application of variable voltage control to independent drive and reel motors. A number of installations, wherein none or not over one of the working rolls is driven and where the backing-up rolls or first set of cluster rolls may or may not be driven are in successful operation today in this country.

The Steckel mill, Fig. 31, is a reversing mill employing working rolls which vary in diameter from 2 to 5 inches with backing-up rolls about 6 to 8 times the working roll diameter and utilizing two separately driven tension reels through which all power is provided. Due to the fact that the working rolls are not driven, it is necessary to raise them apart on the loading (initial feeding) pass in order to insert the coil end into the reel's jaws. The rolls are then run-down on the material for the initial reduction and the strip pulled through the mill entirely by tension. The mill is stopped when the tail end is at the proper point for insertion into the jaws of the reel on the entry side of the mill.

During alternate passes on all reversing mills, the reel used during the previous pass as a tension reel is used as a regenerative (producing current rather than using current) feed reel for maintaining back

tension. Amount of draft that may be taken on any pass through a Steckel mill is limited to that tension whose horizontal component is less than the tensile strength of the strip being processed. Similarly, the front and back tensions on the strip during any type of cold reduction or skin passing must not exceed its tensile strength. It is customary to take an odd number of passes on a reversing mill in order to speed up the threading operation of the next coil while the cold-reduced coil is being removed from the tension reel on the opposite side of the mill.

A recent improvement in design for mills using small diameter working rolls consists of the addition of a drive for the top and bottom back-up roll, Fig. 32, and is called the CMP mill (Cold Metal Products Co.). It is apparent that such a drive will increase the amount of draft that can be taken and will reduce strip breakage. Three passes are ample to reduce 0.093-inch pickled coils to 0.0359-inch (20 gage) which is a very popular size used in the automotive and metal furniture industries. Five passes are utilized to reduce 0.076-inch to 0.010-inch tin plate thickness. Single stand reversing mills of the conventional four-high type have been used extensively for the production of tin plate and narrow strip of carbon steel specifications, as well as high tensile steels and stainless steels. Single stand mills of the Steckel and Sendzimer type are used almost exclusively for the production of high tensile and stainless steels. It will be noted that those portions of the coil extending from the working rolls to the front and back tension reels receives only one reduction of

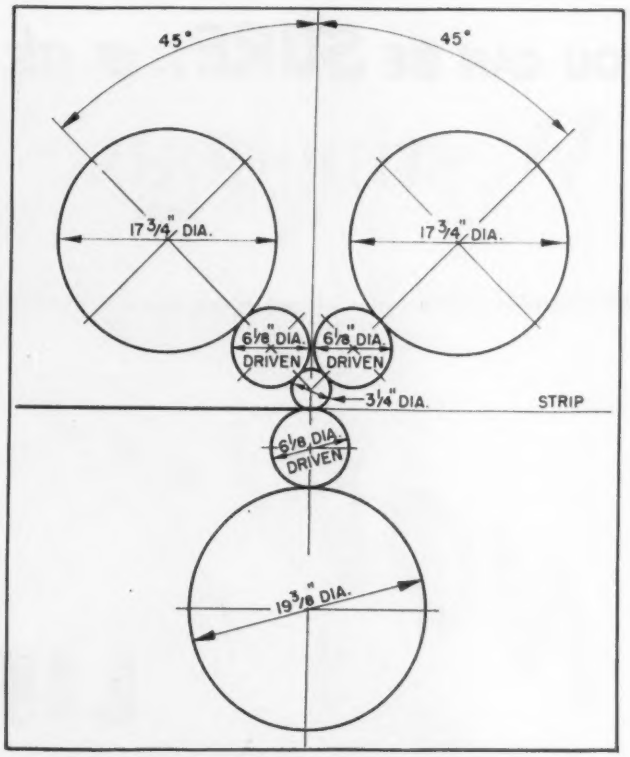
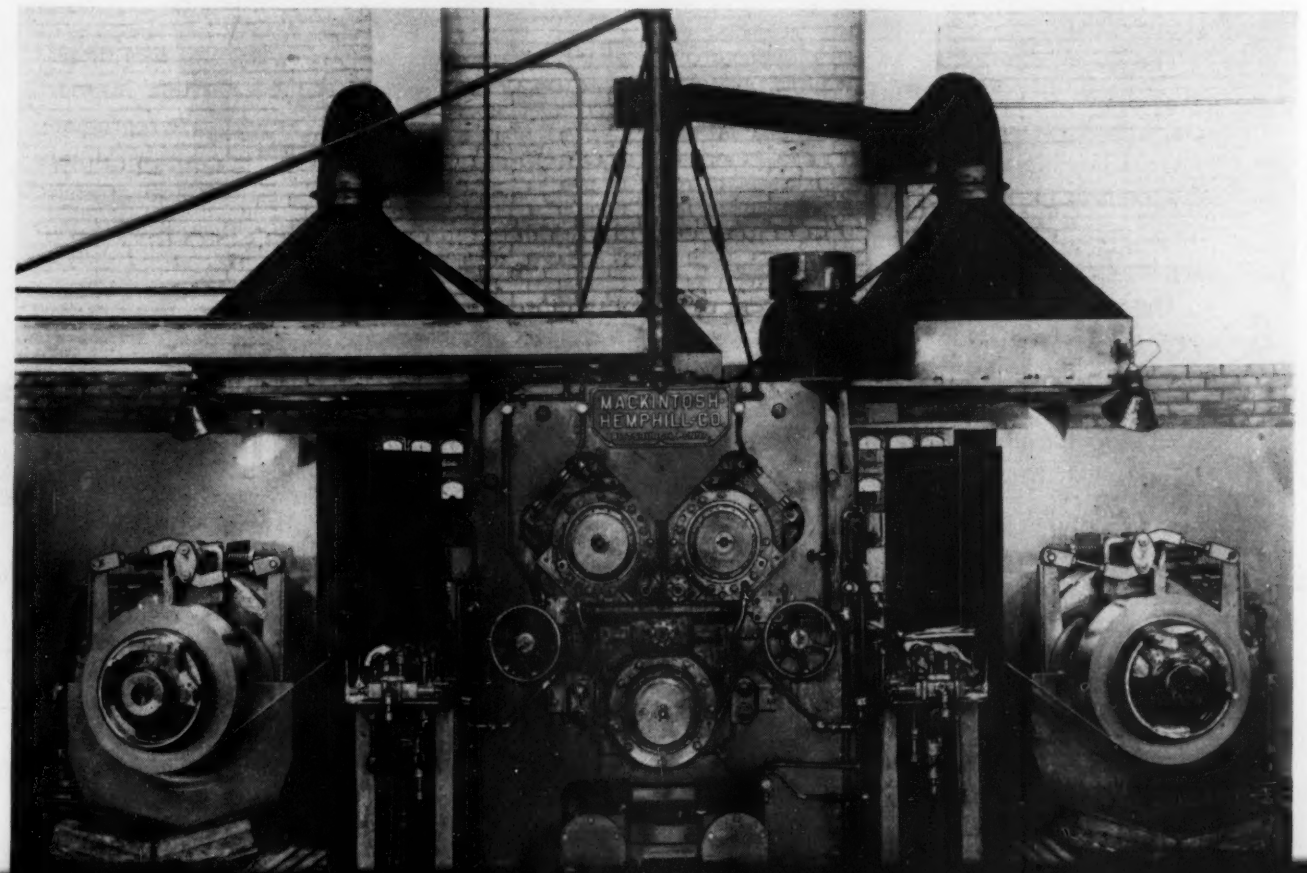


Fig. 37—Roll layout for a 20-inch reversing Y-mill. Mackintosh Hemphill photo

about 25 per cent on a conventional four-high reversing mill and none on the Steckel or Sendzimir mill unless carbon-steel leader strips are welded to the coil ends. These heavy ends are usually disposed of as secondary products. Competition with tandem mills has almost completely eliminated the use of single stand reversing mills for the production of carbon-steel sheets and tin plate. A single stand

Fig. 38—View of Y-mill showing arrangement of rolls and tension reels. Screw-down mechanism can be noted below the bottom back-up roll. Mackintosh Hemphill photo



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Add these savings—$270 for lubrication plus $480 for outages—and the result is $750 per hundred motors per year.

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unit will produce about 15 net tons per hour on sheets as contrasted with 60 net tons per hour on a three stand tandem mill and about 9 net tons per hour of tin plate compared with 70 to 80 net tons per hour on a high-speed five stand tandem tin mill. Its popularity for the production of specialty steel still continues.

Omission of a tension reel on the entry side of a single stand mill permits operations of a nature somewhat similar to that of a reversing mill except on a "one-way basis". When operating a mill so equipped, it is the custom to give about ten coils their initial reduction before giving them their next pass. By so doing, coils retain some of the heat generated during the previous pass which facilitates operation of the next pass, especially as regards ability to maintain accurate gage and shape.

The Sendzimir mill, Fig. 34, is a mill of the cluster-type with working rolls as small as 7/16-inch in diameter, each being supported by two driven intermediate rolls, which are backed-up by three sets of casters or by three additional intermediate rolls supported by four sets of casters, thus making a twelve-high or a twenty-high mill. Caster assemblies, Fig. 35, consist of stationary shafts upon which the casters are mounted with a support between each two casters. The casters are the outer races of roller bearings with a special section designed to withstand heavy localized pressure, transmitted to them by the intermediate rolls. Intermediate rolls are not backing-up rolls but are merely a medium for transferring working roll pressure to the casters and as pointed out above, the first set of these rolls act as drivers for the working rolls. The entire assembly is housed in a box-like structure having no resemblance to a set of typical mill housings and access is gained to the working parts by opening a side plate not unlike a safe door. The mill is provided with a recirculating system for the coolant and all moving parts are flooded during operations. The small diameter working rolls permit the taking of drafts up to 90 per cent in the lighter gages and the mill's great rigidity permits extremely light gages of great accuracy to be produced. Driving of the first set of intermediate rolls has been of great assistance in taking heavy drafts and has materially reduced the hazard of exceeding the elastic limit of the strip and pulling it apart. Adjustment of the working rolls for gage is accomplished by means of eccentric shafts on four of the caster assemblies rather than by screw or wedge as is used on a conventional four-high or Steckel mill. A recent installation of a Sendzimir mill, Fig. 36, capable of rolling stainless steel 37 inches wide is equipped with working rolls 1 7/16 inches in diameter and casters of 9 inches in diameter. The motive power consists of a 400 horsepower mill motor and 300 horsepower reel motors, giving a top speed of 440 feet per minute and an estimated production of 1500 to 1700 tons of stainless steel of 24 gage thickness per month. Reductions can be made from 0.135 to 0.010-inch in eight passes without intermediate annealing and pickling (or descaling).

A recent development in single stand cold rolling mills has been the construction of a mill which derives its name, the Y-mill, from the arrangement of the working and backing-up rolls. An inspection of the sketch of the roll layout for the Y-mill, Fig. 37, reveals that the bottom working roll and backing-up roll resemble those of the conventional four-high mill while the top working roll and backing-up rolls are patterned after a cluster mill except that there is a set of intermediate backing-up rolls between the top working roll and the main backing-up rolls. Top intermediate backing-up rolls and the bottom working roll are driven through spindles from the mill pinion stand while the top working roll whose diameter is slightly over one-half that of the bottom working roll is friction driven. In rolling mill language such a roll is called a "baby roll." The upper roll arrangement of this mill differs from most cluster type mills in that means are provided for shimming up the top main backing-up roll chocks to compensate for reduction in roll diameter, thereby maintaining the centers of the top working roll and the intermediate and main backing-up rolls on the same axis. This adjustment maintains an approximate 90 degree angle between the main backing-up roll chocks, which is essential for the successful operation of the mill. Working rolls are opened and closed by means of a motor operated screw assembly which raises and lowers the bottom working roll and backing-up roll, Fig. 38.

A 20-inch reversing mill of this type requires a main mill motor of 600 horsepower and two reel motors of 200 horsepower each, giving, when thus equipped, a delivery speed of 1200 feet per minute. Sequence of operations of this mill are similar to those of the conventional four-high reversing mill described previously. The rigid construction of the mill plus the advantages of a small working roll combines to give it considerable flexibility as to its ability to handle heavy and light sections along with high accuracy as to finished gage. This type of mill has proved satisfactory for the cold reduction and skin passing of high and low carbon steels and stainless steel.

(To be continued)

Castings Periodical

Cooper Alloy Foundry Co., Hillside, N. J., is publishing a new periodical, *Newscast*, for those who design, specify, use or purchase stainless steel valves, fittings or engineered castings. Application stories depicting how castings serve in industry as well as detailed technical data about these alloys, will be used in conjunction with special features.

Hydrocarbon Samples

Total of 162 compounds is now available as standard samples of hydrocarbons for calibrating analytical instruments and apparatus in the research, development and analytical laboratories of various industries, according to National Bureau of Standards, Washington, D. C. The bureau, along with American Petroleum Institute, have prepared the samples through a co-operative program begun in 1943.

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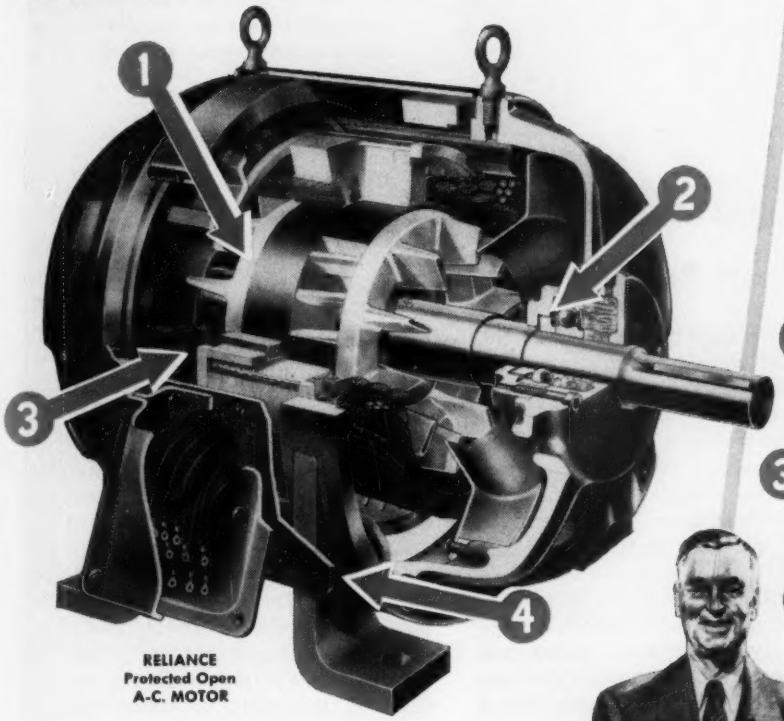

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Press Breaks Down Steel Ingots into Billets

Steel ingots are broken down into billets and various rounds and flats by a 1500-ton steam operated hydraulic press recently put into operation by Jessop Steel Co., Washington, Pa. It is reported that much of the work now done on the forging press was previously accomplished in the company's blooming mill. Use of the press is expected to result in substantial savings in time, ingot mold costs and in grinding costs. It is also stated that there is less chance for "checks" or cracks to show up on the surface of the steel when it is worked in such a manner.

Two large soaking pits for heating the ingots prior to forging, a large machine known as a manipulator for holding the ingots during the forging operation and a large reheating furnace are the items of auxiliary equipment required for the new press. The soaking pits employ concrete walls with a "pyrofac" lining. Repairs on the inside of the pit walls reportedly can be quickly made without requiring a long cooling period.

Rot Preventing Paint

Wood and other organic surfaces may be protected against mold and rot by paints introduced by paint manufacturers using Reynolized aluminum pigment, a development of Reynolds Metals Co., Louisville, Ky. Using aluminum particles as a base, this new pigment contains agents integrated by a special process.

Lowers Material Costs

Phenolic molding powders which will enable the plastics industry to achieve lower material costs with little or no sacrifice in the properties of high-quality molded parts have been developed by the General Electric Co.'s. chemical department, Pittsfield, Mass. The four compounds, black and brown for compression and transfer molding, have a specific gravity of 1.37 and are said to have flow characteristics, cure time, and water resistance nearly equal to wood flour-filled phenolics.

Strip Steel Extension Measured

At Speeds of 2000 Feet Per Minute

MEASUREMENT of the percentage of extension of strip steel during rolling in temper pass mills may be continuously indicated and recorded with an extensometer, according to G. H. Rendel of the research laboratory, Carnegie-Illinois Steel Corp., where prior to installation of this instrument, it was common practice to measure strip extension by a hand operated gage. According to Mr. Rendel, such measurements could not be made satisfactorily at mill operating speeds in excess of approximately 200 fpm. Since installation of the extensometer, mill operators have abandoned the practice of measuring extension by manual methods and are said to be relying entirely upon the instrument for all extension measurements, at operating speeds up to 2000 fpm.

Instrument is designed to indicate and record the percentage of extension being effected on the temper pass mill, by measuring the entry and delivery speeds of the strip, and comparing the differential between the two speeds with the entering strip speed. The speed differential is obtained by a system consisting of two synchronous transmitters, one driven by the entry and the other driven from the delivery deflector roll (see diagram). The synchronous transmitters are electrically connected to a synchronous differential receiver which drives the tachometer generator that generates a voltage proportional to the true differential speed.

A second tachometer generator is driven by the entry deflector roll and generates a voltage proportional to the strip entry speed. These two voltages are applied to a self-balancing potentiometer which indicates the ratio of the two voltages. Since this ratio is proportional to the strip extension, the potentiometer is calibrated accordingly. Equipment is designed to operate with an accuracy of approximately 0.04 per cent over a range of approximately 8 to 100 per cent of normal strip operating speed, states Mr. Rendel, while measuring extension varying from 0.1 to 8 per cent.

He said that a number of tests have been conducted to check the performance and accuracy of the instrument on an actual installation, including numerous tests in which the indicated extension was compared with that of measurements obtained from marked test coils. These coils were scribed prior to temper rolling and the extension was determined by computing the increase in measured distance between the scribe marks after temper rolling. Results disclosed that approximately 60 per cent of the tests indicated the same amount of extension by both methods and that the maximum deviation between the extensometer indication and the measured extension was in the amount of 0.1 per cent.

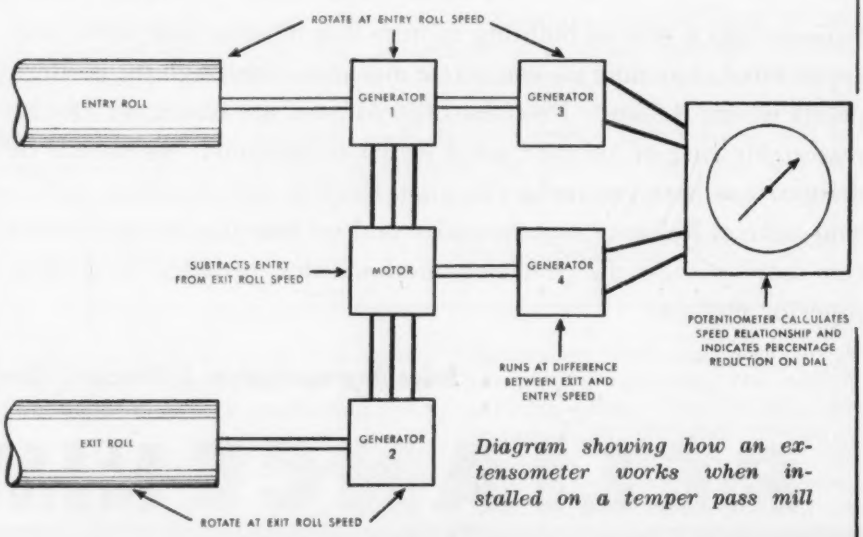

Diagram showing how an extensometer works when installed on a temper pass mill

Hughes-Keenan Corporation
Increases Truck Payloads 20% with J&L OTISCOLOY high-strength steel

J&L STEEL

(Above) *Spot-welding a truck roof-reinforcement and bow assembly, made of* J&L *Otiscoloy steel, at the Hughes-Keenan Corporation, Delaware, Ohio. Both the panel and bows are cold formed.* (Left) *Truck bodies on the Hughes-Keenan assembly line.*

Builds stronger, longer-lasting truck bodies with less steel

Eliminating 20% of the deadweight from milk truck bodies is not the only advantage in using J&L Otiscoloy high-strength steel, according to Hughes-Keenan Corporation, Delaware, Ohio.

For good sanitation, milk truck bodies must have their interiors steam-cleaned every day. Moisture from melting ice refrigeration during milk delivery is always present. Normally the continuous wetting and drying would cause rapid corrosion in a milk truck body made of mild steel.

Otiscoloy resists rust four to six times as effectively as mild steel. This pays off to the truck owner in longer service life. And it pays off to Hughes-Keenan Corporation in having a better quality, lighter, longer-lasting truck body.

The quality in these truck bodies does not entail added production costs. Although high-strength steel is more expensive than mild steel, Otiscoloy is used two gauges lighter with equal or greater strength than ordinary mild steel. Four sections can be made from Otiscoloy where only three sections of equivalent strength could be made from the same weight of mild steel. More units are produced per ton, freight costs are reduced, units are lighter, easier to handle during production.

Otiscoloy is recommended for applications where strength without bulky weight is desired—also where corrosion, abrasion and fatigue are problems in the service life of equipment.

Otiscoloy can be formed hot or cold, welded, forged, flame-cut and otherwise worked by standard methods. Here is a *modern* steel that is worth *your* investigation. Why not return the coupon to us today?

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Pittsburgh 19, Pa.

Please send me at once a copy of your booklet, "Otiscoloy High-Tensile Steel."

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From its own raw materials, J&L *manufactures a full line of carbon steel products, as well as certain products in* OTISCOLOY *and* JALLOY (*hi-tensile steels*).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

New Facility for

DRAWING STAINLESS WIRE

With a rated capacity of 500 tons per month, American Steel & Wire Co.'s entirely new Waukegan, Ill., plant will concentrate on production of wire rounds ½-inch and finer

STAINLESS steel wire in rounds ½-inch and finer, and certain size flats will be manufactured by a specially-designed and entirely new mill of American Steel & Wire Co. Located at Waukegan, Ill., this United States Steel Corp. subsidiary plant has a rated capacity of 500 tons per month, making it one of the largest stainless steel wire producers in the country. All equipment is so geared in power that it will be possible to increase output greatly in the future with very little additional equipment.

Rod Storage—Raw materials for the new mill are rods received primarily from the Joliet, Ill., plant of American Steel & Wire Co. The latter plant's supply of stainless steel billets is produced at the South Chicago Works of Carnegie-Illinois Steel Corp.

A revolving, tilting crane has been provided because it was desired to have flexibility for supplying the rod storage inspection area and the storage bin. Normal flow of material is to unload the car and deposit rods in racks adjacent to the inspection and welding area from which they move to the rod storage bins.

The rod inspection area is equipped with several storage racks; two jib cranes and hoists; flash welders; pointers; upset testing machine and bundle compressor. Here the rods are individually inspected, welded end-to-end into 500-pound parcels and compressed into a neat package for efficient handling in the ensuing annealing operation. In detail, every bundle is given a visual examination for surface defects. Upset tests are made. A second coil is inspected and, if satisfactory, is welded to the first, using the flash welder.

This equipment is new to the stainless wire industry but preliminary tests have indicated that most stainless steels can be welded satisfactorily. As the rods are received they are welded and sent either to storage or to the annealing department for treatment prior to drawing. The bundle is weighed and the weight recorded on the ticket and the duplicate roll tape. Proper designating numbers are used for establishing heat and type indentification on each 500-pound bundle.

The bundle is removed from the inspection arm and placed in the bundle compressor by the rod storage crane, where two 500-pound bundles are compressed together into a neat package for proper handling either in the rod storage bin or in the rotary annealing furnaces. In the event rods are going directly to the cleaning house, it is not necessary for this procedure to be executed. Four 500-pound bundles are accumualted in a rack adjacent to the inspectors; the rod storage crane removes the pin carrying four 500-pound bundles to the rod storage area, the rotary furnace annealing department or the cleaning department, as scheduled or allocated by the planning department.

Two inspection stations are provided. Purpose of the foregoing operation is: (1) To check the quality of rods received; (2) to determine accurately the weight of rods in inventory; (3) to eliminate the detrimental effects of small bundles upon the operating efficiency of wire drawing equipment; and (4) to accomplish the same purposes and, equally important, to provide a proper point for the coarse wire drawing operation.

Twenty-six bins have been provided for storage of at least 500 tons of stainless steel rods. Two 1000-pound pins are stocked at one time, records

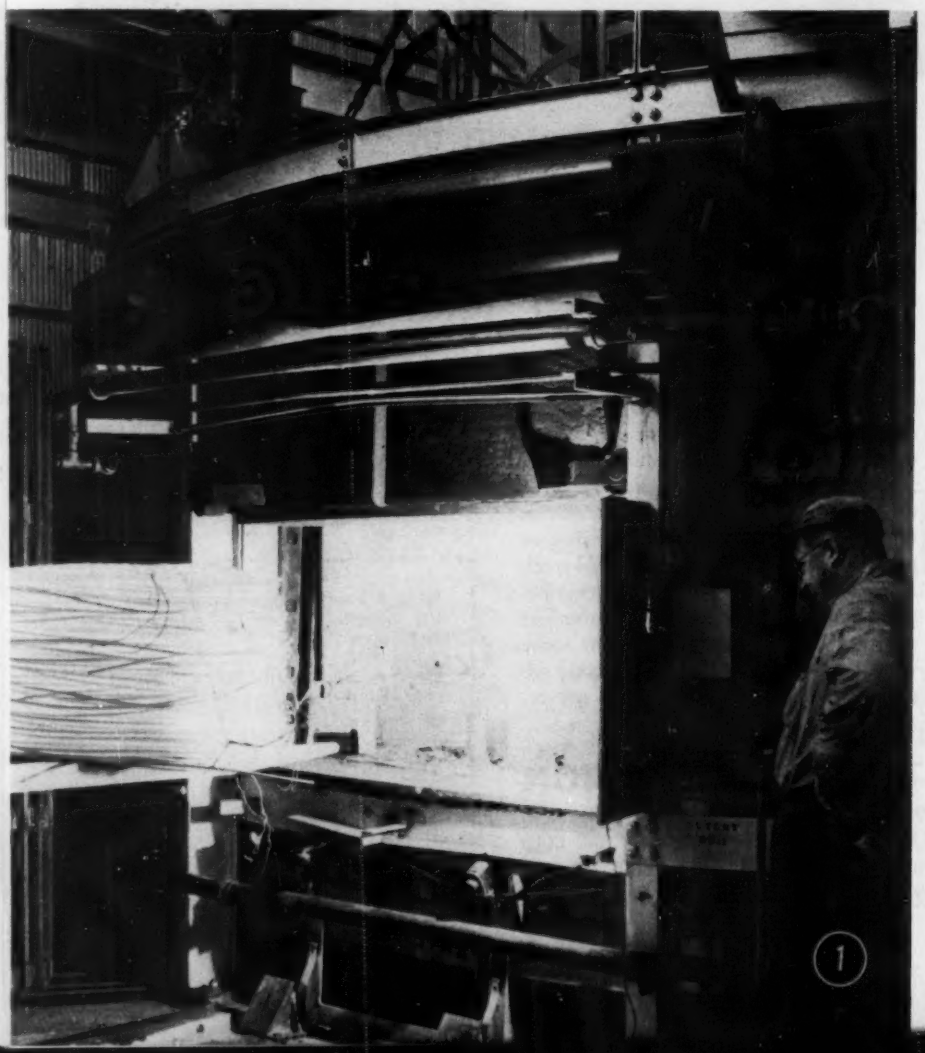

Fig. 1—One thousand pounds of stainless steel rods are removed from one of the new rotary hearth furnaces

being kept of exact weight of rods held in storage.

Rotary Hearth Annealing Furnaces—One ton of rods consisting of two 1000-pound packages is brought to the annealing department by the rod storage crane. This load is split into two 1000-pound charges for the annealing furnaces by the overhead crane operated in conjunction with upending machines. These machines flip the vertical bundles into a horizontal position so that they may be readily handled by the fork tractor which charges the rotary annealing furnaces.

Two large and one small rotary annealing furnaces are provided. All can be operated at 2100° F and all are controlled from a common control house located at the north end of the department. The large furnaces may be operated in any one of three different ways. The most predominant will be the continuous treatment, whereby 1000-pound package will be charged periodically, resulting in an approximate capacity of 4000 pounds per hour for each large furnace. In this operation, the furnace temperature is 2100° F throughout the cycle.

A batch method will also be used whereby the entire furnace will be charged with cold steel, brought up to temperature and cooled at a definite rate until the proper discharge temperature is reached. This method applies only to the martensitic and ferritic grades of stainless steel.

The third method is somewhat a repetition of the first. Furnaces may be zoned so that steel is subject to certain temperature requirements as it passes through the furnace. This applies primarily to ferritic grades. The small furnace was so planned that special steel, experimental cycles and small lots can be handled without interfering with the operation of large units. It will also batch anneal finer gages of wire.

The quenching tank is equipped with a heat exchanger which prevents the solution from becoming too hot. Temperatures from 40 to 180° F will provide equally effective results.

Cleaning House—A stainless steel cleaning department is quite different from what the carbon steel wire industry commonly calls the cleaning house. This is entirely due to the multiplicity of cleaning operations required. Equipment includes tanks for muriatic, sulphuric, and nitric-hydrofluoric acids. Quenching, spray and coating tanks have been provided for water; and for copper, lime and other wire coatings. Cleaning is performed in an electrically heated salt bath furnace.

To accomplish the various functions in the cleaning house, it is necessary to utilize different acids, namely: Muriatic, sulphuric, nitric and hydrofluoric. The muriatic (hydrochloric) is used for activiation; sulphuric for neutralization; and the nitric-hydrofluoric for passivation. All of the acids are handled in carboys.

Wire Drawing—Due to the complexity of stainless steel requirements, wire drawing equipment has been set up to produce many different finishes. All coarse wire drawing equipment is variable speed. This feature has been incorporated for several reasons: (1) Actual optimum wire drawing speed for stainless steel is variable; (2) maximum flexibility is required; and (3) due to the wide range of sizes it is expected to produce, it would have been necessary to have over twice as much machinery if set, constant-speed units were installed.

Coarse-wire drawing equipment includes the following machines: (1) Two heavy-duty 100 hp motor blocks, (2) eight medium-duty motor blocks, (3) four four-draft continuous machines, (4) one six-draft continuous machine.

Auxiliary equipment includes flash welders, rod butt welder, a wire butt welder, 4 rotary swaging machines, 6 roll pointing machines, 3 flipper reels, 28 miscellaneous revolving reels as well as twelve 1000-pound electric hoists.

The two vertical-spindle, heavy-duty motor blocks are equipped with 26-inch and 30-inch interchangeable blocks and strippers. The blocks and die-holders are water cooled. They are driven with 100 hp dc, three-to-one speed range motors, which results in a block speed varying between 17 and 51 rpm. Thus, when using 26-inch blocks, these machines have a speed range of 115 to 345 fpm. These two machines make up one complete work station.

Eight medium-duty motor blocks are equipped with speed indicators. Two rotary swaging pointers are provided for sizes 0.200-inch and coarser, and two roll pointers for sizes 0.250 to 0.0625-inch. Like the heavy-duty motor blocks, these machines have water-cooled blocks and die holders. For flexibility, four machines are equipped with 26-inch blocks; three have interchangeable 22 and 26-inch blocks; and one, 22-inch and 16-inch interchangeable blocks. These units are powered with 50/60 hp dc three-to-one variable speed motors, which result in speeds of 44 to 72 revolutions per minute. Thus, the available speed range for 26-inch blocks is 162 to 499 fpm; on 22-inch blocks, 138 to 414 fpm; and, lastly, on 16-inch blocks, 101 to 303 fpm. The stripping capacity is 500 pounds for 26-inch blocks; 400 pounds for 22-inch blocks; and 300 pounds for 16-inch blocks.

Four and Six-Draft Continuous Machines—The four four-draft continuous wire-drawing machines are likewise equipped with different sizes of finishing blocks. Primarily, the process wire is wound on 26-inch blocks and two machines are so equipped; three have interchangeable 26-inch, 22-inch and 16-inch blocks so that it is possible to use these machines as wire processing units. All blocks are air and water-cooled and the die boxes are also water-cooled.

Each spindle of each machine is driven by a separate three-to-one speed range, 25 hp dc motor. This results in finishing speeds of 200 to 600 feet per minute using the 26-inch block; 169 to 507 fpm using the 22-inch block; 123 to 369 fpm using the 16-inch block. Stripping capacity handles 300-pound bundles for the 16-inch blocks; 500-pound bundles for the 22-inch and 26-inch blocks. These machines are designed to finish wire from 0.062 to 0.150-inch diameter. In one machine, the

Fig. 2—Vertical stainless steel wire drawing blocks, employing vertical motors, require less floor space than old types

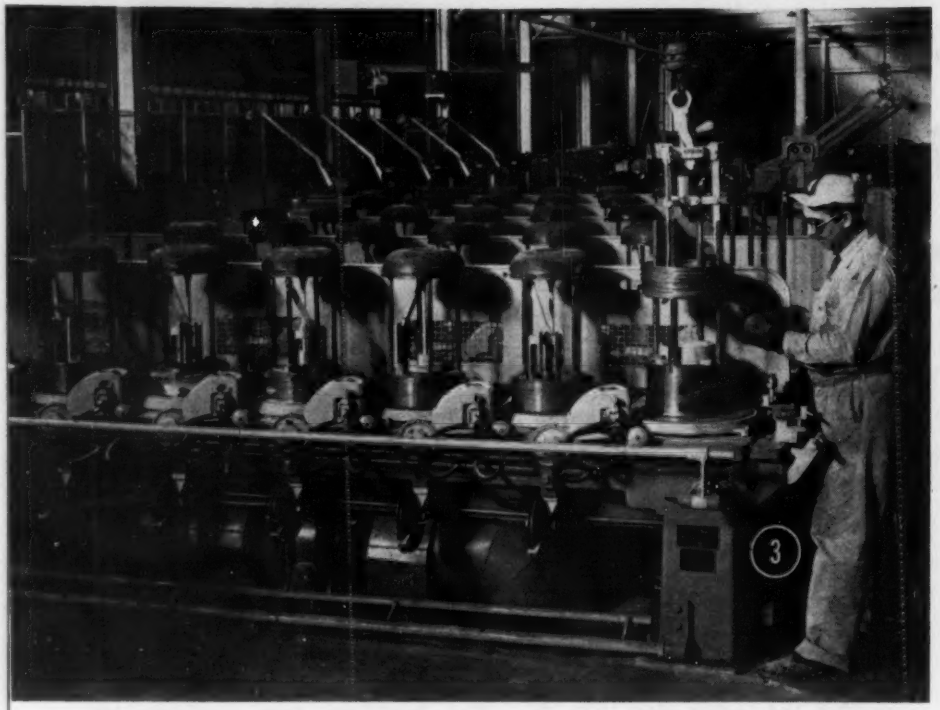

Fig. 3—From these wire drawing machines comes stainless steel spring wire, armature binding, rope and weaving wire for processing into very fine sizes

blocks may be used singly or in pairs, thus providing a unit similar to a bench.

The six-draft continuous wire drawing machine is quite similar to the four-draft units and the same features are incorporated. This machine will finish on 16-inch blocks having a capacity of 300-pound bundles. Each spindle is driven by separate three-to-one speed range, 15 hp, dc motor which results in finishing spindle speeds of 250 to 750 fpm. The machine is designed to process wire having a maximum size of 0.150-inch and finishing 0.080-inch and finer.

Fine-Wire Drawing—Equipment incorporated in the fine-wire drawing department is as follows: (1) Five 8-draft, 8-inch and 12-inch finishing block machines having fixed reductions between drafts for proper stainless practice. The finishing block has a variable speed of 300 to 900 fpm, and is capable of finishing wire to as fine a size as approximately 0.020-inch. (2) Ten 12-draft wet-wire machines complete with spooling attachment. These units are also capable of finishing 8-inch coils. Each machine has a maximum speed of 2000 fpm with an expected operating speed of 500 fpm. These are used for drawing wire as fine as 0.004-inch.

(3) One 10-wire, 5-draft tandem machine. This machine has a speed ranging from 100 to 400 fpm, and is capable of finishing on spools only. (4) Three 16-draft machines are used primarily for drawing very fine wire.

Fine-Wire Bright Annealing—All fine stainless steel wire shipped in the annealed condition is continuously bright annealed. A 30-wire unit has been installed for the bright annealing of fine wire. Up to a set size range, speeds may be increased to keep capacity at a uniform rate. This equipment is furnished with spool-handling facilities for both the pay-off and take-up ends. The furnace itself is electrically heated by means of nonmetallic resistor elements. Tubes through which the wire passes are made of Inconel to withstand the high temperatures involved. An atmosphere of dissociated ammonia is employed, which is really a mixture of hydrogen and nitrogen. To conserve consumption of ammonia, the tube diameters are only ⅛-inch. A double tube arrangement minimizes the consumption of ammonia and decreases the flow. Care is taken at all times to insure proper working conditions, as even a slight amount of air or moisture in the tubes will cause the production of tarnished wire.

A second unit is a 14-tube furnace and was installed to bright anneal the coarser sizes ranging from 0.030-inch and up to 0.090-inch. This unit has been equipped with cranes, reels and a conventional strand takeup as auxiliary equipment. A 12-wire strand annealer has also been installed.

Tin Coating—Stainless wire is primarily tin coated for armature binding wire. The tin is not applied as a protective coating but acts primarily as an aid to automatic soldering by the user. It is the practice to tin and spool in one operation. The equipment consists of cleaning, washing and flushing tanks; gas-fired tin melting furnace and conventional spool and takeups. A feature of the spooling take-up is the fact that torque motors are employed, making it possible to operate at predetermined tensions.

Three wire cutting machines have been provided for cutting 1/16-inch to ½-inch wire, to meet requirements that various types and finishes be straightened and cut. These include soap and grease drawn wire.

To obtain a superfine finish on certain grades of products, two centerless grinders have been provided. They are so located that one operator can handle two machines, especially where the particular wire requires a rough grinding and a fine grinding operation. Only straightened and cut wire is centerless ground.

Considerable tonnage of flat wire will be made from a process round wire. Two new cold-rolling machines complete with all necessary facilities have been provided. One is an 8-inch machine and the other a 6-inch machine. A product such as cotter-pin stock will be made on this equipment. Provision is made so that wire can be given one, two or three passes through the rolls to obtain an ultimate quality product. It is important that all process wire be accurately gaged so that the final product meets user specifications. A fully-equipped testing laboratory is located adjacent to the finishing and inspection lines. It is so designed as to accelerate the attainment of quick and accurate information as it affects the operating and finishing departments.

Steel Products Manuals

Released by American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y., are four new steel products manuals. Designated as sections 21, 23, 25 and 27, the manuals deal with concrete reinforcing bars, tolerances for alloy steel sheets and strip, tool steel tolerances and rail steel, respectively.

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Subject index of technological documents issued in Volume X of the Bibliography of Scientific and Industrial Reports is available from Office of Technical Services, Department of Commerce, Washington 25, D. C., for $1. Reports on any subject carried in the period from July to December, 1948, are included.

Only FORGINGS Offer So Many Sure Fire Ways to Obtain Lower Costs At The Point of Assembly

Macro-etch cross-section of Steering Lever forging shows how density of grain structure insures safety in operation of trucks and busses.

The maker of a Disc Clutch embodying this forged steel actuating lever increased the rate of machining two and one half times by having it forged.

A weight reduction of 22 per cent and a considerable saving in machining and finishing time was obtained by forging this Clutch Yoke used with an air-cooled gasoline engine.

This Sprocket forging weighs 18 lbs. less than the bar stock formerly required to produce it. Maker reports 40 per cent saving in machining and finishing time as result of forging to shape.

There are thousands of instances where forgings have reduced the cost of parts at the point of assembly. Forgings provide qualities and economies that are otherwise unobtainable. Forgings provide rapid assembly of complex parts by welding adaptability of widest range. Forgings permit reduction of dead weight because maximum strength and toughness are obtainable in lighter sectional thicknesses. Forging to shape avoids waste of metal and reduces machining and finishing time-cost. Forgings provide the strength and toughness for unrelenting and uninterrupted performance. The metal quality and cost-reducing possibilities obtainable in forgings cannot be duplicated. Recheck every stressed part in your equipment, as well as simple handles and levers, and consult a Forging Engineer about the possibilities for reducing parts' costs at the point of assembly. Only a Forging Engineer can inform you fully regarding the numerous advantages obtainable with forgings.

DROP FORGING ASSOCIATION

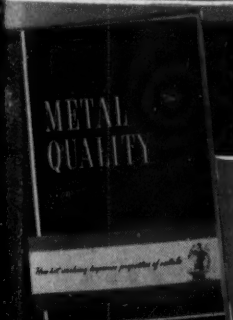

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Fig. 1—Marine basin, Kure Beach

KURE BEACH **METAL CORROSION TESTS**

. . . corroborate existing theories under actual service conditions

LATEST findings at Kure Beach, N. C.—world-famous proving ground for measuring the attacks of natural sea water and sea air on metals and their alloys—are of major interest to manufacturers of fabricated metal products and others concerned with the selection of materials that stand up best under such service conditions. These findings, in the main, corroborate existing concepts; their value lies in the fact that they are based upon behavior of test specimens during long exposure to natural sea water and atmosphere.

They are summarized in a general way as follows by Frank L. LaQue, manager of the Kure Beach operation: All steels corrode faster when denied the opportunity to be dried thoroughly after each wetting by action of the air and the sun's rays. In general, alloy steels have much greater resistance to sea water and sea air corrosion than carbon steels, and this superiority becomes more marked as the attacks are intensified; for example, carbon steels deteriorate much more rapidly than alloy steels in the tidal zone than in the air at a site 800 feet from the ocean. Too, painted coatings give more and longer protection to alloy steels under all marine conditions than to carbon steels.

By E. C. KREUTZBERG
Washington Editor, STEEL

Painted steel sheets containing 2 per cent nickel and 1 per cent copper have three times the life of painted carbon sheets in racks located 800 feet from the ocean and ten times the life of painted carbon steel sheets when exposed to direct ocean spray. The advantage of the low-alloy sheets when immersed in sea water is even more striking. Austenitic cast iron containing 14 nickel, 6 copper and 2 chromium is 21 times more resistant to sea water erosion than is ordinary cast iron.

Fig. 2 — Examining effect of velocity and sea water corrosion

Cupro-nickel alloys containing approximately 90 copper and 10 nickel have outstanding life when used in condenser tubes and salt water piping and the same is true of cast tubes of the same type metal containing about 1 per cent iron.

Copper-bearing steel containing 0.2 to 0.3 per cent copper is easier by far to protect with painted coatings in and around sea water than is carbon steel. The protective value of composite plating in and around sea water depends upon the thickness of the nickel coat; a nickel coat 0.001-inch thick gives good protection, but far better protection is obtained with nickel coatings 0.002 and 0.003-inch thick. An interesting discovery was that a nickel coat 0.0005-inch thick buffed and polished and finished off with a second 0.0005-inch coating gives roughly the same protection as a single 0.002-inch coat. Copper as a base coat material came out of the tests in a sorry plight. The best that can be said for copper base coats is that they add no protection whatever; in fact, many plated specimens with copper base coat showed

much more deterioration than specimens in which the nickel was plated directly on the steel. Finish plate of chromium was found to add nothing to the protection of the steel, but it was found to keep the nickel plate from tarnishing.

Nickel-chromium plating on straight chromium stainless steels does not add perceptibly to the behavior of such compositions in and around sea water. Results of the tests bear out the conclusion that chromium plating of chromium stainless on automobiles is desirable chiefly to get a color match with chromium plated steel.

Other metals and alloys justify their cost in structures which must not be allowed to deteriorate in and around the ocean. Hastelloy C, after taking every test at Kure Beach, including 3500 days in the sea water erosion test, has come out with no weight loss or other deterioration. Pure titanium specimens have undergone no deterioration whatever in 9 months of testing. Zirconium, the newest metal to go into the racks, has not even developed an oxide coating after 1 month's exposure. Chromium-nickel stainless specimens exposed for 9 years show no other deterioration than the oxide coating developed in the first few months of exposure; incidentally, electropolishing was found to be of considerable value on stainless specimens. Monel metal and Stellite show no deterioration after exposure for many years.

Straight-Chromium Stains

Straight-chromium specimens containing 9 and 13 chromium stand up well as to weight loss in and around the ocean but show marked tendency to stain. The 18 per cent chromium composition stands up much better against staining.

For the maintenance of steel structures at Kure Beach, chlorinated rubber paint, coal tar enamels and vinyl coatings have proved most effective. Aluminum paint has been found to give the best protection to aluminum and magnesium. On steel specimens in the test rack 800 feet distant from the ocean, sprayed coatings of aluminum, zinc and lead continue to give near-perfect protection after 6 years' exposure.

Past concepts must be modified by the discovery that isolated pieces of steel are more difficult to protect by this method than when steel members are joined together continuously —as in sheet steel piling, ships, etc. Another upsetting discovery is that the theory of polarization in relation to galvanic action does not hold good; some of the more "noble" metals like titanium were found to polarize

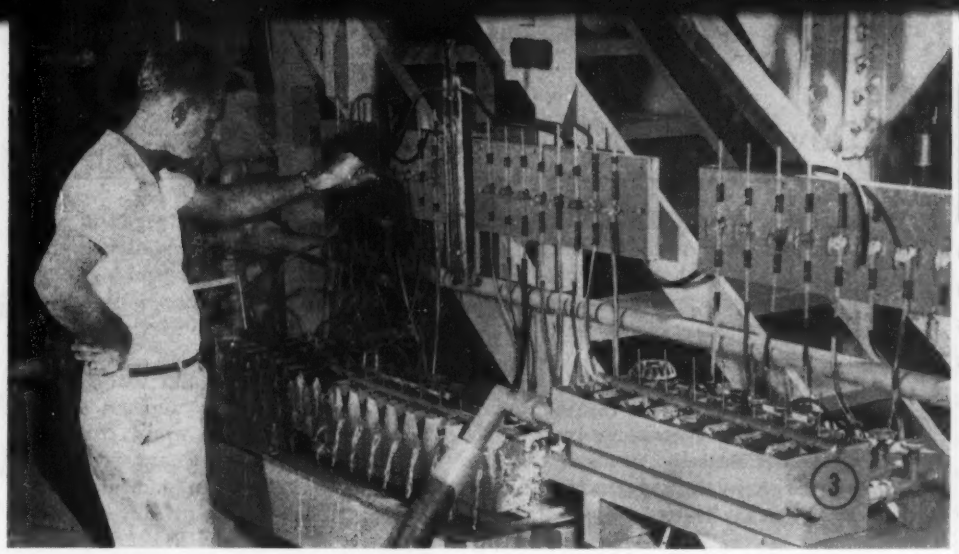

Fig. 3—Jet test apparatus

at low current densities as compared with metals that corrode in sea water. Another discovery is that it is much easier to give cathodic protection to carbon steel in quiet sea water—as when ships are laid up in quiet waters—than in turbulent sea water. Another finding is that when using high-grade zinc of 99.9 purity as the anode three times as much protection is obtained as with 99 per cent zinc. It also has been ascertained that the cost of cathodic protection, using magnesium as anodes, and observing efficient practices, ranges from 2 to 3 cents per square foot of steel surface per year in ships or other structures to be protected.

In the months ahead, cathodic protection will receive further study. This work will be helped by the fact that two cargo ships—one in the lay-up fleet at nearby Wilmington, N. C., and another in the James river fleet—have been put at the disposal of the Kure Beach organization by the Maritime Commission. The aim is to show that cathodic protection is a very low-cost technique compared with the expense of towing ships to dry dock and scraping and painting them.

At Kure Beach itself a better understanding will be sought of the polarization characteristics of the different steels and metals and their relation to galvanic action. In addition, Kure Beach is about to launch a program aimed at complete protection of sheet steel piling in sea water. Cathodic protection will be relied on for that portion of the piling below low tide, while painting will be employed on the area above the splash zone; the plan is to protect the intermediate portion in the tidal and splash areas with Monel metal sheathing, plugging up the open ends at top and bottom with pitch and filling the intervening space between the sheath and the piling with heavy oil. At least that is the approach as it is projected at the present time.

Another interesting study about to be launched at Kure Beach will be concerned with the paint adhesion properties of steel surfaces obtained by electrodeposition of nickel on the surfaces of sheet bars prior to rolling into sheets. It is believed that such treatment will lead to much more effective protection of steel in and around the ocean.

Mecca for Producers

Kure Beach, whose maintenance and development costs are shared by the International Nickel Co. and Dow Chemical Co., is getting to be more and more a mecca for the producers of materials used in and around sea water. Many companies, and such government agencies as the Navy, Army and Air Force, have specimens in the racks there and receive all possible co-operation from Mr. LaQue and his staff of experts. In a completely equipped laboratory they are able to measure weight losses in the specimens, make microscopic examinations, measure galvanic action and perform all other necessary work. Some 20,000 specimens are under exposure in the sea itself, in the ocean spray area 50 feet from the water line, and in the atmospheric racks 800 feet from the water line.

Ability of Monel metal to resist the attacks of sea water and sea air is one of the impressive features of the installation. When the plant was equipped in 1935, Monel metal was selected as the material for constructing many of the racks that hold test specimens; after 14 years' continuous exposure they are as serviceable as they were in the beginning. Another material of which many racks are constructed, and which continues to serve without appreciable weight loss, is the cupronickel alloy containing 70 copper and 30 nickel.

titanium symposium that alloys of titanium have been investigated at Battelle using both powder metallurgy methods and arc melting techniques. It was pointed out that alloy additions to titanium metal will vary in effect as a result of the differences in purity of the metal produced by the various processes. The work at Battelle utilized titanium powder produced by the magnesium reduction method as well as that produced by the DeBoer process of hot-filament decompositon of titanium iodide.

On one phase of the Battelle program, alloys of titanium and oxygen, nitrogen, or hydrogen were made up by the gas absorption and diffusion method using iodide titanium as the starting material in the form of specimens 6 inches long and about 0.080-inch square. The alloy compositions investigated were 0.25, 0.50, and 1 atomic per cent additions each of oxygen, nitrogen and hydrogen. Hardness and tensile tests were made on the various alloys. The data given by Cross for the nitrogen and oxygen alloys, indicate that both nitrogen and oxygen harden titanium to about the same extent, with nitrogen possibly having the greater effect. The hardness increased from 120 Vickers to 240-260 Vickers. Hydrogen up to 1 atomic per cent (0.021 weight per cent) does not increase the hardness of titanium.

As a result of studies on tensile strength and elongations of these titanium alloys, it was reported that nitrogen has a considerably greater strengthening effect on titanium than oxygen, increasing the tensile strength almost threefold, while for oxygen the increase was about two fold. Nitrogen correspondingly decreases the ductility to a greater extent. Hydrogen was stated to have a very slight strengthening effect. Determination of cold-rolling characteristics indicates nitrogen is more deleterious to cold rollability than is oxygen. The work-hardening characteristics of titanium-hydrogen alloys were similar to those for pure titanium.

Effect of Oxygen and Nitrogen—It was pointed out in further discussion of the Battelle work, that similar experiments on the effect of oxygen and nitrogen additions have been made in arc-melted titanium powder. During the arc-melting process, the oxygen additions were made in the form of titanium dioxide and the nitrogen additions in the form of titanium nitride. Table VII shows the mechanical properties of the alloys obtained. Cross pointed out that the titanium powder used in preparing these melts was gassy and it was found that some degree of contamination resulted in every heat. The data (Table VII) indicate substantial increase in strength and hardness for these melts with intentional additions of oxygen and nitrogen, but it is not proper to ascribe the total effects measured to these gaseous elements because of the indeterminate effect of the tungsten content. However, it was emphasized that most of the strengths shown in Table VII are considerably in excess of those usually associated with the small tungsten contents indicated, all of which are less than 4 per cent.

Table VII also shows the effect of carbon additions to arc-melted titanium. As with oxygen and nitrogen, the effect of carbon is clouded by tungsten contamination, but the data do serve to indicate that a high level of strength and ductility is obtainable in a titanium alloy with both carbon and tungsten present. Also, there are no indications that carbon in moderate amounts is detrimental.

High-Melting Point Metals—Cross indicated that early work conducted at Battelle on alloys of titanium with the high-melting point metals, chromium, molybdenum, tungsten, columbium and tantalum, indicated that the compositions of interest for engineering properties lay below the 20 per cent addition level. Fig. 12 summarizes the results of investigation of the binary alloy range of the above metals in 0 to 10 per cent additions.

Molybdenum, tungsten, columbium and tantalum in amounts up to 20 per cent were found to increase the tensile and yield strengths progressively. Chromium has the same effect, but only in the alloys with chromium up to 10 per cent, because of the excessive amount of intermetallic compound present in the 20 per cent chromium alloy. It was found that the metals, chromium, molybdenum, and tungsten of Group VI-A of the periodic table strengthen titanium to a greater extent than columbium and tantalum, metals of Group V-A.

Strength levels attained even at 20 per cent additions by these alloys, prepared by powder metallurgy methods, are not so high as those shown by arc-melted alloys with less than 4 per cent tungsten and with additions of oxygen and nitrogen. Thus, it was pointed out by Cross, while the data show strengthening effects for chromium, molybdenum, and tungsten additions, their greatest usefulness may well be in combination with other additions. It was also brought out that the tensile properties of ternary alloys of chromium, molybdenum, or tungsten with titanium are slightly better than those of the binary alloys with equivalent alloy content. The rate of work hardening of these alloys was stated to be about the same, or slightly less, than that of unalloyed titanium.

Some of the more interesting titanium-base alloy compositions investigated by Battelle, and their properties based on individual bar values are given below:

1. 0.4 per cent carbon, 3.8 per cent tungsten, as hot forged. 169,000 psi tensile strength, 11.5 elongation, hardness Rockwell C 32.
2. 0.5 oxygen (intended analysis), 2.04 per cent tungsten, after heating at 1750° F and water quenching. 167,000 psi tensile strength, 4.5 per cent elongation, hardness Rockwell C 43.
3. 0.3 per cent nitrogen, 1.88 per cent tungsten, as hot forged. 169,500 psi tensile strength, 3.5 per cent elongation, hardness Rockwell C 31.
4. 0.6 per cent nitrogen, 0.13 per

TABLE VII

DATA COLLECTED AT BATTELLE MEMORIAL INSTITUTE SHOWING EFFECT OF OXYGEN, NITROGEN, AND CARBON ON MECHANICAL PROPERTIES OF ARC-MELTED AND HOT-FORGED TITANIUM.

Alloy Composition, %	Rockwell C Hardness	Tensile Strength, p.s.i.	Yield Strength, p.s.i.	Elongation in 1 Inch, %
Arc-melted titanium	19	95,000	80,000	25
0.14 oxygen, 0.11 nitrogen, 0.3 tungsten	31	112,000	.....	1.5
0.25 oxygen, 2.23 tungsten	40	168,000	.....	0.5(a)
0.67 oxygen, 0.16 nitrogen, 0.24 tungsten	42	160,000	.....	0.5
0.15 nitrogen, 1.41 tungsten	34	145,800	.....	2.5
0.29 nitrogen, 1.88 tungsten	31	169,400	.....	3.5
0.46 nitrogen, 1.69 tungsten	45	191,400	.....	0
0.15 carbon, 1.5 tungsten	27	130,800	117,600	21
0.25 carbon, 2.5 tungsten	35	147,000	129,800	10
0.39 carbon, 3.8 tungsten	31	169,000	.....	11

(a) Defective bar may have influenced measured ductility.

16 FEATURES

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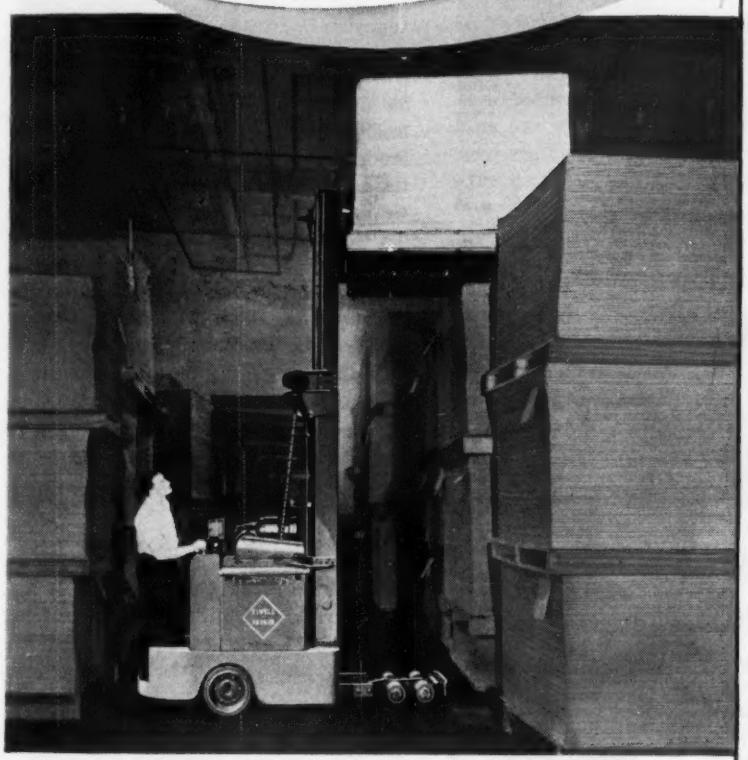

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E-P PIONEERED **6** Design of both end and center models eliminates any hindrance from dismounting from either side or off rear. Maximum visibility.

7 Cushioned pedals or seats, easy steering, controlled speed, and smooth, quiet operation reduce driver fatigue.

8 Power steer on larger models.

E-P EXCLUSIVE **9** On trucks with 4 or 6 wheel steer, each tire turns on a concentric circle to facilitate steering and reduce wear. Maximum access to wearing parts without dismantling.

E-P EXCLUSIVE **10** Class B motors are standard; exclusively built by Elwell-Parker for use in their trucks.

E-P EXCLUSIVE **11** Costly glass and asbestos insulation makes motors practically indestructible and fire proof.

12 Motors have more copper, more brushes and greater commutator area.

13 Alloy steels used where maximum strength is needed.

E-P EXCLUSIVE **14** More drop forgings used than in the average truck.

15 "Tank-tough" frames welded and riveted into a unit of heavy gauge plate.

E-P EXCLUSIVE **16** Unmatched engineering knowledge due to *longer* experience in the power truck field.

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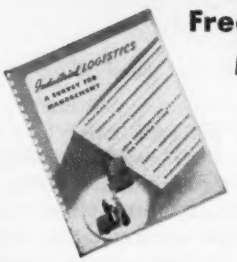
4501 St. Clair Avenue • Cleveland 14, Ohio



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cent tungsten, after heating at 1750° F and water quenching. 155,000 psi tensile strength, 7 per cent elongation, hardness Rockwell C 38.

5. 4.7 per cent tungsten (gas content not determined), as hot forged. 198,000 psi tensile strength, 2 per cent elongation.
6. 5.0 per cent chromium and 0.25 per cent carbon (intended), also 0.01 per cent tungsten, 0.063 per cent nitrogen. 171,000 psi tensile strength, 2 per cent elongation, hardness Rockwell C 41.

Other Promising Alloy Systems—E. I. Larsen, chief metallurgist, and other members of the metallurgical research department at P. R. Mallory & Co., reported at the Naval titanium symposium on a number of alloy investigations carried out with titanium. Included in the work were binary alloys of titanium and hydrogen, beryllium, boron, aluminum, indium, carbon, silicon, zirconium, vanadium, chromium, tungsten, molybdenum, manganese, iron, cobalt and nickel. From these investigations it was concluded that the following alloy systems have characteristics which might be of practical value:

1. Alloys containing up to 5 per cent aluminum. Noteworthy feature of these alloys is their ability to hot and cold work and their greatly increased resistance to oxidation over that of pure titanium.
2. Alloys containing about 5 per cent manganese.
3. Alloys containing up to 1 per cent beryllium. Indications are that alloys of this type can be heat treated to produce high hardness and tensile strength while retaining some elongation.
4. Alloys containing up to 1 per cent boron.
5. Alloys containing up to 1 per cent silicon.

Liquid Oxygen Converter Is Self-Contained

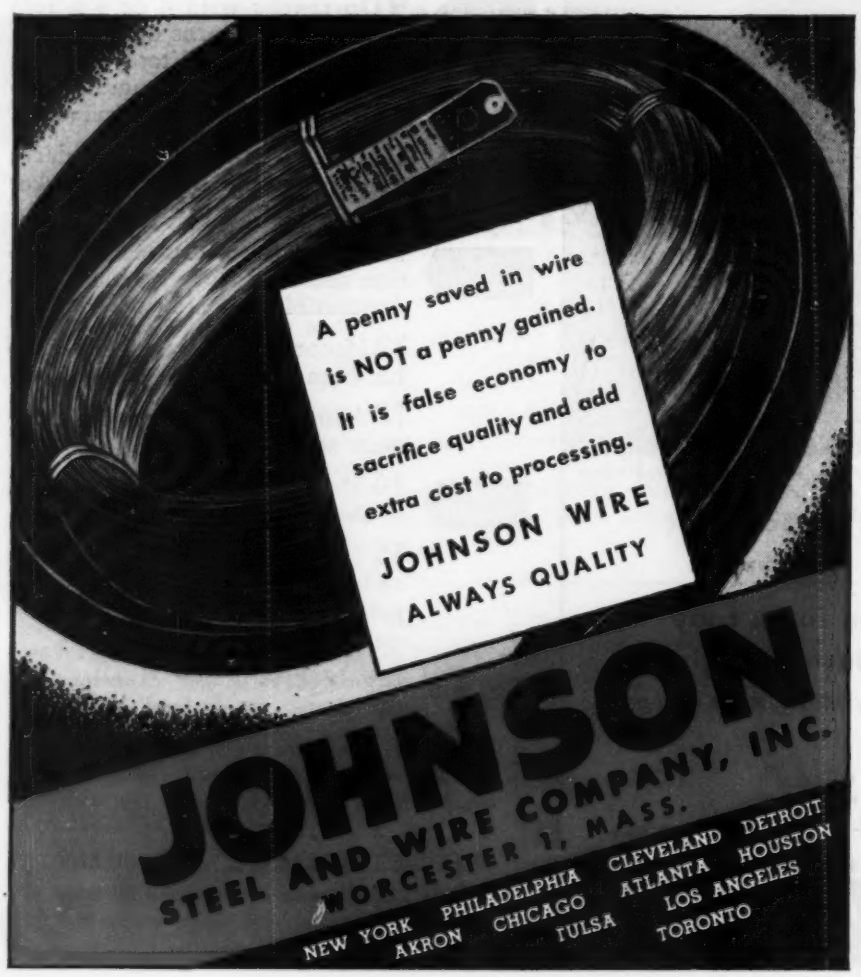
Fully automatic and requiring no electric or other source of power is a liquid oxygen converter, developed by the National Bureau of Standards, Washington, D. C. Its compactness and greatly reduced weight are said to represent a decided advance over gaseous equipment now used to supply oxygen. Simplicity of design and operation, rapid attainment of operating pressure, economy of oxygen and delivery of warm gas are features incorporated in the newly designed equipment.

Unit Has Many Uses

Although developed by the Bureau in co-operation with the Bureau of Aeronautics, Department of the Navy, for use in high altitude flying, the unit is expected to be used in the welding and cutting of metals, in maufacturing and refining processes and in the operation of certain types of engines. For all of these uses, both weight and bulk of containers can be greatly reduced if the oxygen is stored in liquid form. Liquid oxygen is five times as dense as oxygen gas under 2000 psi.

Converters consist of a standard 25-liter metal Dewar flask, modified by the addition of a bottom drain, together with two coils, one for build-up of pressure and one for warming the gas as it is delivered. Unit is 25 inches high and 18 inches in diameter and weighs 60 pounds. It holds 62 pounds of oxygen which, if used for breathing purposes, would be enough for 10 men for 10 hours. To supply this quantity of oxygen from gas cylinders at 1800 psi, 21 tanks of 514 cubic inches each would be required, these tanks weighing a total of 330 pounds empty.

Pressure may be built up when the container is full, from 0 to 65 psi in 10 seconds. Pressure once achieved is quite stable and, although it drops with vigorous shaking, recovery is almost instantaneous. Converter has withstood tests at the National Bureau of Standards and other Government laboratories, under conditions of severe vibration, rapid acceleration, severe cold and severe heat. In reliability and safety the new converter is said to compare favorably with high-pressure gaseous oxygen systems.



Turning Jobs

(*Concluded from Page* 65)

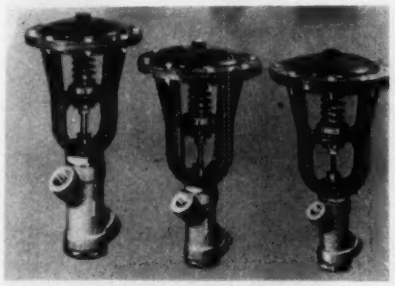
is mounted on a pivoted holder, while rear tools and one front tool make their cuts. The front finishing tool is swung forward into cutting position in Fig. 2. During the finishing cuts, a roller on the holder rides on the crankpin being finish turned.

After finishing cuts are made, both front and rear tools are backed off and the operator polishes the cuts with emery cloth and gages the piece before removing it from the lathe. With this setup, about three pins an hour are finished.

New Products and Equipment

Low Pressure Valves

Line of diaphragm-actuated D-113 Merit valves for almost every type of low pressure service are available in sizes of ¼, ½, ¾, 1, 1¼, 1½, 2 and 3 inches from Emmett Machine & Mfg. Co., 2249 14th St. S. W., Akron 14, O. They are designed for maximum pressures of either 300 or 500



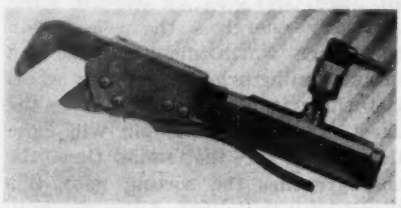
psi. The 300 psi valves are made of hydraulic bronze while the higher pressure models are of high tensile alloy bronze.

Stems, seats and disks are highly resistant to corrosion and serve to minimize electrolysis. Heat treated Monel is used for all seats and disks. Valves can be changed to normally open, normally closed or three-way operation.

Check No. 1 on Reply Card for more Details

Pneumatic Vibrators

Removing match-plate patterns from sand molds, assuring steady flow from hoppers feeding parts for assembly, vibrating tables used in packaging, fatigue testing assemblies, etc., are within the range of applications of the series SA pneumatically



operated vibrators announced by Cleveland Vibrator Co., 2780 Clinton Ave., Cleveland 13, O. Tools feature low air consumption, minimum number of parts, instant starting with full power and suitability for a wide range of applications.

Seven sizes of vibrators are available with five different mounting arrangements, one of which is shown. Air consumption ranges from 5 to 8½ cfm on 80-pound line pressure. Speeds range from 5100 on the smallest size to 1950 vibrations per minute on the largest. The square steel body is heat treated, ground, hard-chromed-plated and has anvil type heads uniformly hardened.

Check No. 2 on Reply Card for more Details

Plating Machine

Designed primarily for all types of chromium plating and provided with a lead-lined Armco iron tank, the Cro-Plater plating machine, developed by W. S. Rockwell Co., 200 Eliot St., Fairfield, Conn., can deliver any required amperage up to 300 under precision control of current

and temperature. Unit is equipped with a blower which exhausts fumes from the tank and force-cools the copper oxide rectifiers.

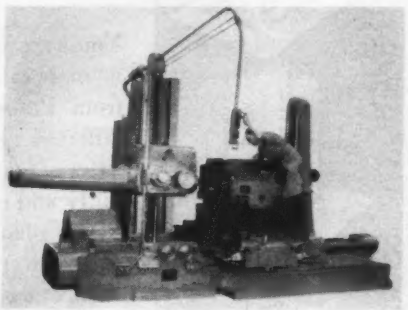
Unit can be used for other metals where the standard lead-lined tank is suitable. Plain steel, rubber-lined or other types of tank construction can be provided. It is made in one size with a 45-gallon tank measuring 18 x 24 x 30 inches, electrically heated by a thermostatically controlled unit located outside and at the bottom of the tank. Six rectifier stacks deliver up to 300 amp at 1 to 15 v for the plating operation. Required is 220 v, 3 phase, 60 cycle, 50 amp current input.

Check No. 3 on Reply Card for more Details

Boring Mills

Built in 3, 4, 5 and 6-inch spindle sizes with both electrically and mechanically controlled models, is the line of Lucas precision horizontal boring, drilling and milling machines built by Lucas Machine Division, New Britain Machine Co., 12302 Kirby Ave., Cleveland, O. They are equipped with automatic power positioning for both table and head, allowing the operator, using dial indicators, to accurately repeat on spacing operations, either horizontally or vertically.

The mills have a one-piece bed which is well ribbed and of deep box construction. It extends continuously

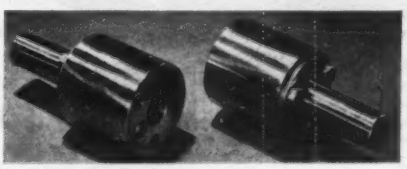


beneath the column and table with two or four ways for table and saddle support. Ways on the bed, saddle and column, are hard steel inserts or flame hardened ways. Mills have one spindle with both high and low speeds. On high speed work, the spindle is directly driven by V-belts and all vibrations are dampened by the fly wheel action of the by-passed low speed gears. Work ranges of 36 x 36 to 84 x 94 inches are covered by the machine line.

Check No. 4 on Reply Card for more Details

Tap Holders

New tap holder, made by Marcellus Mfg. Co., Belvidere, Ill., to operate within 0.005-inch, has a hole all the way through it so that only the



working part of the tap need be exposed. The rest can be shoved back into the holder. If a tap should break, the extra length is moved out, ground down and is ready to operate again. The shank that fits into the turret is separate from the body of the holder.

Sensitive pawl is so calibrated that the moment the motor is reversed, the ratchet cannot ride more than a quarter turn before catching. By changing the direction of the pawl,

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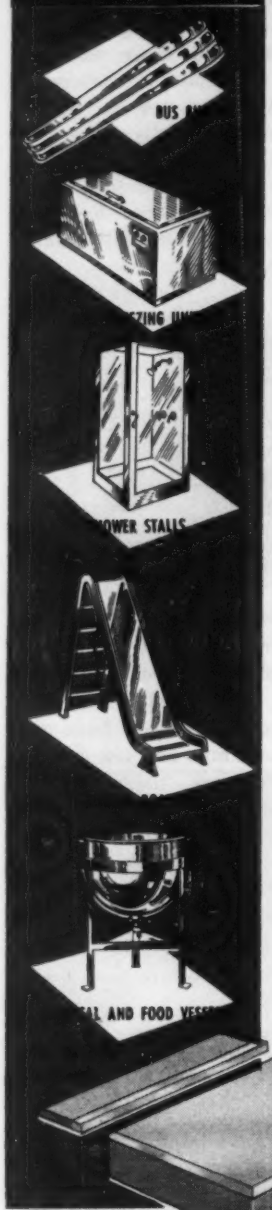

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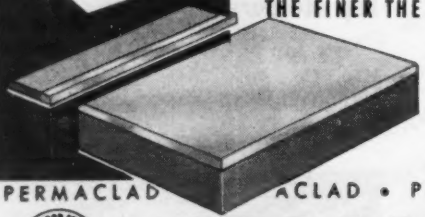

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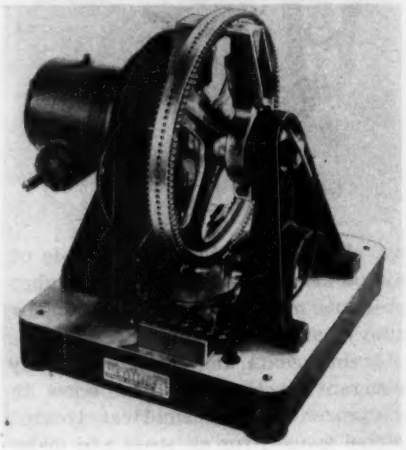
the tap holder may be changed for right or left hand tapping. Holder may be made nonreleasing by removing releasing pawl and inserting a larger and flat nonreleasing pawl.

Check No. 5 on Reply Card for more Details

Timing Device

A remote controlled timing device that will direct or classify or sort almost anything that is produced continuously or that travels on a conveyor mechanism is the Syncro Timer, introduced by Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford 1, Conn. The self-



contained remote control delayed action relay unit is driven directly by the mechanism so that acceleration, deceleration or even stopping does not affect its performance accuracy.

In a typical installation, tin plate strip cut into sheets from a continuous coil might be sorted at the rate of 1000 fpm, this being done accurately and automatically regardless of shear line speed. When the pin hole detector indicates defective material or if the continuous gage registers off gage thickness, an impulse automatically energizes the solenoid in the timer which displaces the pin in the timing wheel. As this wheel is turning in direct proportion to the sheet travel rate, the pin will close the switch at the same time the sheet reaches the sorting gate, this diverting it to its proper classification. Timer, which may be used singularly or in sections, is furnished in three models with 48, 132 and 248 pins.

Check No. 6 on Reply Card for more Details

Tool Grinders

Featuring construction for vibration-free, accurate and volume grinding, the V-belt driven carbide tool grinders offered by Standard Electrical Tool Co., 2504 River Rd., Cincinnati 4, O., are available in 1 and

Over the Long Haul

The FERRY CAP Spring Bolt *Proves its Mettle*

This Ferry Cap Spring Bolt is one of hundreds of different designs which we make for leading truck manufacturers. We manufacture them to various head shapes, with oil holes and grooves of different kinds, and flats accurately milled. Precision is a principle at Ferry Cap.

The bolt has maximum ground surface-wearing qualities. It is case hardened to proper depth, achieving a hard surface with a relatively soft core, assuring both long wear and high fatigue strength. The thread end is annealed to make it tough, but not brittle—more than equal to the required thread strength.

The body is ground to close tolerance, oil holes expertly drilled, and flats milled to a smooth, true surface to allow free flow of lubricants. The cotter holes, accurately drilled, are free from burrs. Result—the bolt fits perfectly.

It is a spring bolt of which any truck manufacturer can well be proud—a clean cut, precision-made, long-wearing, tough, dependable product.

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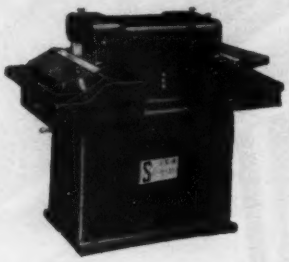
3 hp. Machines may be used for either wet or dry grinding and have reversible and totally enclosed motors. The pushbutton and reversing magnet starter has overload and under-voltage protection.

Work tables may be adjusted to 15 degrees above and 30 degrees below horizontal with an easily ready graduated dial. Table assembly, guard and splash pan are adjustable through screw feed to compensate

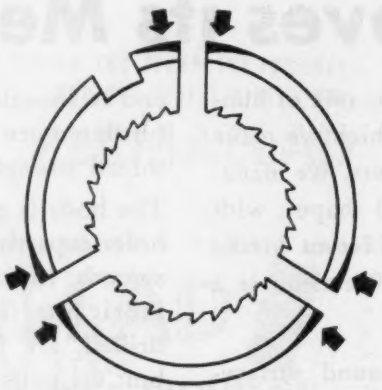


for wheel wear. Adjustable nozzles supply coolant for wet grinding. Conversion to dry grinding is accomplished by closing coolant valves, opening gates at each wheel and connecting to exhaust system at rear of grinder. Base incorporates coolant reservoir, settling chamber and drain for cleaning and flushing.

Check No. 7 on Reply Card for more Details

Collets

Cam relief at the slots on the external bearing surface of all collets made by Sheffer Collet Co., Traverse City, Mich., provides positive bearing in the center of each jaw section. Known as the cloverleaf grind, it is



applied to all collets for hex and square stock as well as round. The cam form provides for a tighter lock with less strain on the chucking mechanism and free release regardless of stock variations or worn conditions of either collet or spindle.

New grind has the advantage of free action in high speed operations where fast opening is essential. Amount of contact surface on bearing and the amount of relief are controlled by a master cam assuring correct proportions and uniformity. Collets also feature ground external threads and heli-grip serrations.

Check No. 8 on Reply Card for more Details

Torque Analyzer

Accurate checking of the tightening capacity, range and adjustment of power torque tools is possible with the Livermont analyzer, developed by Richmont Inc., 2810 E. 11th St., Los Angeles 23, Calif. Applications include: Showing the torque at which the clutch and direct drive releases and at what rate torque increase is accomplished beyond the releasing point if held into engagement. On cushion clutch drives it will show at what torque the clutch releases

and begins to impact, at what torque is gained after the impact starts, and the ultimate torque capacity of the tool. On pure impact, it reveals the power delivering capacity of impact, the time required to reach a certain torque and the ultimate capacity of the tool.

Analyzer is mounted on a portable stand equipped with casters. Overall measurements are: Height, 3 feet 6 inches; length, 2 feet 2 inches, width 1 foot 8 inches. Weight is 195 pounds. No power connection is required, the device being entirely mechanical. A master torque wrench is furnished with each unit, so that accuracy can be checked periodically. When necessary, the machine can be reset in a few minutes.

Check No. 9 on Reply Card for more Details

Notching Unit

Permanent alignment of all parts of Wales louver notching unit, made by Wales-Strippit Corp., 345 Payne Ave., North Tonawanda, N. Y., are assured of perfect alignment by be-

RIDING THE RAILS

for 21 Years...

A Twin Disc Clutch was first used by Nordberg in 1928 on this Track Shifter, for which Twin Disc Clutches are still used.

For more than 21 years Twin Disc has been "riding the rails" on track maintenance equipment built by the Nordberg Manufacturing Company, Milwaukee, Wisconsin.

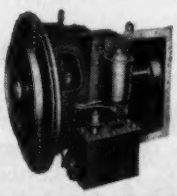
In 1928, Nordberg first started using Twin Disc Clutches to transmit engine power on the Nordberg Track Shifter. Nordberg's most recent Twin Disc equipped machine is the Cribex used to excavate foul ballast from between track ties.

Like most leading manufacturers of heavy-duty equipment, the Nordberg Manufacturing Company has used Twin Disc Clutches and Hydraulic Drives for various types of track maintenance machines on the basis of many years of customer satisfaction.

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin
(Hydraulic Division, Rockford, Illinois).

The Nordberg Cribex on which Twin Disc Clutches and a Hydraulic Coupling are used, is shown as it excavates foul ballast from between track ties.

Heavy Duty Clutch


Hydraulic Torque Converter

Hydraulic Coupling

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CLUTCHES AND HYDRAULIC DRIVES
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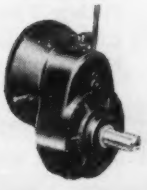
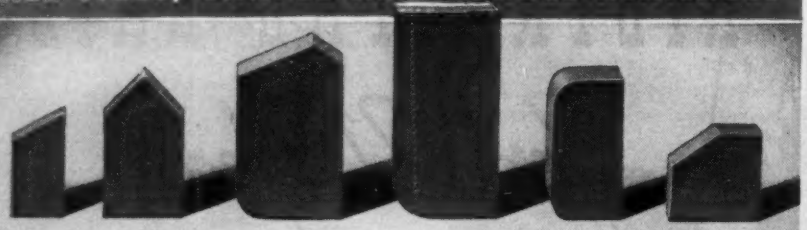

Reduction Gear

Marine Gear

JUDGE TWIN DISC BY THE COMPANIES IT KEEPS

FIRTHITE CARBIDE TIPS
FOR CUTTING TOOLS
ALL SIZES, SHAPES AND GRADES AVAILABLE



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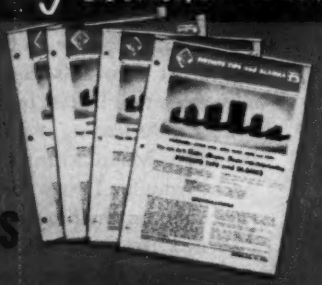

YOU CAN DO IT *better, faster, cheaper*— with *Firth Sterling*

The use of Firthite (sintered carbide) Tips and Blanks for Cutting Tools provides *better* finishes—makes possible the cutting of so-called unmachinable materials and holds to closer tolerances on long runs.

Firthite Tips and Blanks achieve *faster* production—more rapid removal of material—higher output in less time. This results in *cheaper* production because of longer tool life—more continuous performance—less regrinds.

Firthite Tips and Blanks come in all forms and grades to meet every demand of the metal working field. Get in touch with a Firthite Sales Engineer to discuss tooling your machines with Firthite.

Firth Sterling
STEEL & CARBIDE CORPORATION, McKeesport, Pa.
Offices and Warehouses in Hartford, Philadelphia, Cleveland, Detroit, Chicago, Dayton and Los Angeles.
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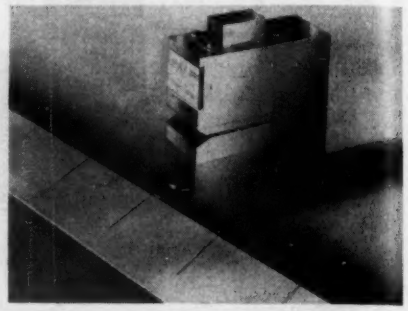
ing built into the self-contained holder. As units are independent and self-contained, the same group of units may be used in unlimited settings in press brakes and stamping



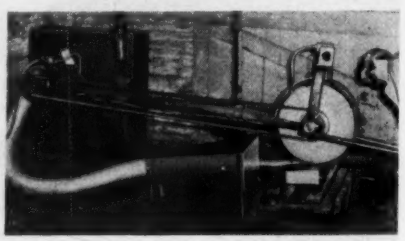
presses. Each is independently mounted to provide quick setups according to varying patterns.

Press ram has only one function, to depress the punch. Punch is not attached to the press ram.

Check No. 10 on Reply Card for more Details

Dust Collector

Dust from swing frame grinding operations can be controlled with the installation of a portable hood and using a model 1150 Dustkop dust collector, made by Aget-Detroit Co., Main at Washington Sts., Ann Arbor, Mich. Dust collector is a self-contained unit requiring no duct work. It has a paddle wheel fan driven by a 1½ hp motor which develops a suction of 1400 cfm. Dust is collected



first by a cyclone separator and by a spun glass filter.

Dust collector and the custom built hood are connected together by means of standard flexible metal hose. A connection to the source of power is the only other installation work required. To accommodate dusts from work of different thicknesses, legs of the hood are adjustable.

Check No. 11 on Reply Card for more Details

Power Truck Auxiliary

Extra heavy crates and similar bulky objects up to 30 feet long may be moved by means of a new lifting and rolling device built by Skarnes Engineering & Supply Co., Minneapolis, Minn. Operator pushes the forks under the forward end of the load and

THESE TRADE Verson MARK FULL ECCENTRIC PRESSES Produce motor boards for automatic record players at the rate of 650 per hour!

The group of Verson Full Eccentric Presses illustrated above form a compact production unit that makes full use of Verson's advantages of speed, accuracy and power. Stock is automatically fed into the press at the extreme right where the first cut-off and drawing operation takes place. The pieces move on for trimming and piercing on the second press and forming in the third press. Final piercing is accomplished in the press at the extreme left. While set up for phonograph motor boards in this view, the presses can be changed over quickly for other jobs.

Get full details on how Verson Full Eccentric Presses can speed your production and lower your costs. And ask about such Verson features as: Allsteel Construction, Full Eccentric Action, "Straight Thrust" Eccentric Strap, Positive Action Clutch and Brake and others. Write today.

Stages in production of motor boards

First Operation: Cut-off and drawing — Second Operation: Trim and Pierce — Third Operation: Forming — Fourth Operation: Final Pierce

Originators and Pioneers of Allsteel Welded Stamping Press Construction

VERSON ALLSTEEL PRESS COMPANY

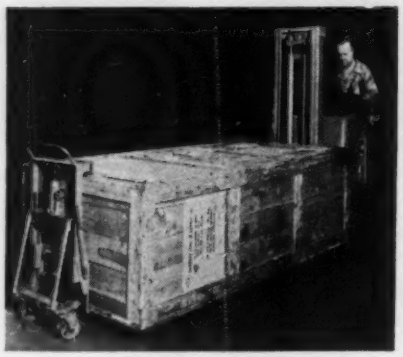
9318 South Kenwood Avenue, Chicago 19, Illinois — Holmes Street and Ledbetter Drive, Dallas 8, Texas

A VERSON PRESS FOR EVERY JOB FROM 60 TONS UP!

BLANKING PRESSES • FORGING PRESSES • DRAWING PRESSES • HYDRAULIC PRESSES
PRESS BRAKES • DIES • DIE CUSHIONS

lifts it by means of the jack to any necessary height up to 9½ inches, after the power fork truck has engaged the opposite end of the load.

According to Elwell-Parker Electric Co., Cleveland, O., the device, called the Rol-a-Lift, has a useful range up to 8000 pounds and combines a lifting and rolling mechanism



in one unit. Three smaller models also are available. Unit is equipped with a pair of handles, a pair of forks 5 inches long and 16 inches apart, two swivel-type wheels and a hydraulic lift jack. The swivel wheels enable the power truck with fork inserted under the opposite end to push and steer the load wherever it is to go.

Check No. 12 on Reply Card for more Details

• • •

ELECTRIC DRILL: Cummins Portable Tools, Chicago 40, Ill., announce a new ¼-inch standard duty electric drill, model 425, for steady light production drilling of metals, wood and compositions.

Check No. 13 on Reply Card for more Details

COLLET CHUCKS: Used for inspecting electrical parts, a nonmagnetic standard face plate collet chuck is offered by Erickson Tools Division, Cleveland 14, O. Every part of the collet chuck except the knurled spanner lock nut is of nonmagnetic conductor material.

Check No. 14 on Reply Card for more Details

GOGGLE: A new chippers' goggle, compression-molded of a phenolic compound and featuring dome metal side screens, is announced by American Optical Co., Southbridge, Mass. Frame is nonflammable, moisture and heat resistant.

Check No. 15 on Reply Card for more Details

ELECTRODE: In the new design of the swivel type resistance welding electrodes, offered by P. R. Mallory & Co. Inc., Indianapolis, Ind., the water hole is drilled completely through the shank. This brings cooling water directly in contact with the swivel head.

Check No. 16 on Reply Card for more Details

LUBRICATING DEVICE: In the Electro-Oiler, developed by Oil-Rite Corp., Milwaukee 7, Wis., oil is released from reservoir by a solenoid operated valve through single or multiple sight feed valves to a number of individual bearings to be lubricated. Operation is entirely automatic.

Check No. 17 on Reply Card for more Details

VENT PLUG: A new translucent plastic vent plug, named Televel, which tells at a glance whether the battery needs water, is announced by Gould Storage Battery Corp., Trenton, N. J.

Check No. 18 on Reply Card for more Details

CAPACITORS: Materials Industry Division of General Electric Co., Schenectady, N. Y., announces a new line of pyranol-filled capacitors suitable for outdoor service. They are available in ratings of 2, 3, 4, 5 and 6 kvar at 460 v with convenient mounting fixtures.

Check No. 19 on Reply Card for more Details

FOOT SWITCH: A treadle-type foot switch, offered by Simonds Machine Co. Inc., Southbridge, Mass., may be used on riveting, stapling and fastening machines, intercommunications systems, signaling devices, etc. It is designated as Linemaster compact foot switch.

Check No. 20 on Reply Card for more Details

STARTERS: Bulletin 3151 size 0 to 1 alternating current manual across-the-line starters designed for application with single or polyphase alternating current motors, are announced by Ward Leonard Electric Co., Mount Vernon, N. Y. They are available in 2, 3 and 4 pole forms.

Check No. 21 on Reply Card for more Details

PORTABLE LADDER: Professional Mfg. Co., Chicago, announces the new Util-Ladder with side rails that are curved at the top to hold it out from the supporting surface. Made of lightweight tubular steel, welded at all joints and finished in wear-resisting lacquer, ladder stands 6 feet high and weighs 12 pounds.

Check No. 22 on Reply Card for more Details

ELECTRODE: No. 384 class E-6020 electrode, announced by Hobart Brothers Co., Troy, O., is designed for making high speed tack welds on heavy weldments without necessity of breaking excess coating from end of the electrode each time the arc is started or restarted. Electrode is available in 14-inch length in ⅛, 5/32, 3/16-inch sizes and 18-inch length in ¼-inch size.

Check No. 23 on Reply Card for more Details

COATING: A new free-flowing coating, named Oncrete for Concrete, is offered by Lowebco Inc., Chicago 15, Ill., for finishing, protecting and decorating exposed parts of machines, motors and other products. It can be sprayed or brushed on and is touch-dry in 30 minutes forming a glossy finish that does not scale, crack or dust off.

Check No. 24 on Reply Card for more Details

MILLING CUTTER: Designed for feed rates up to 60 inches per minute, the new cast iron face milling cutters, made by Diamond-Detroit Inc., Detroit Mich., utilize a solid carbide octagonal-shape blade permitting sixteen production runs without regrinding or resharpening of any cutter.

Check No. 25 on Reply Card for more Details

GENERATOR: A direct current generator that delivers an output voltage which is proportional to the acceleration of the rotor rather than the velocity of rotation is offered by Arma Corp., Brooklyn 32, N. Y. Maximum speed is 5000 rpm.

Check No. 26 on Reply Card for more Details

DIE CUSHIONS: Pneumatic and hydropneumatic die cushions for all type power presses are introduced by Baker Brothers Inc., Toledo, O. Pneumatic cushions are offered in standard sizes from 4 through 28-inch diameter in single piston type and from 10 through 30-inch diameter in double piston type. Hydropneumatic cushions are self-contained and can be supplied to fit any press.

Check No. 27 on Reply Card for more Details

TACHOMETER: Type 48K precision tachometers with ranges especially suited for motor and generator testing are announced by Metron Instrument Co., Denver 9, Colo. Total speed range without adapters is 360 to 4000 rpm which accommodates all synchronous or induction motors and most geared type motors.

Check No. 28 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL markets are rapidly returning to pre-war pattern. Increasingly, the buyer is calling the tune as steel sellers hustle for orders in an effort to drum up sufficient business to bolster steelmaking operations over coming months. Right now mill order backlogs are approaching the vanishing point in many products as the result of the dearth of heavy new buying over the past several months. Consequently, for all practical purposes, the long-hoped-for balance between supply and demand in the steel markets will be a fact with the opening of third quarter. Even in those few products that are still in somewhat tight supply, balance is expected to be struck before end of summer.

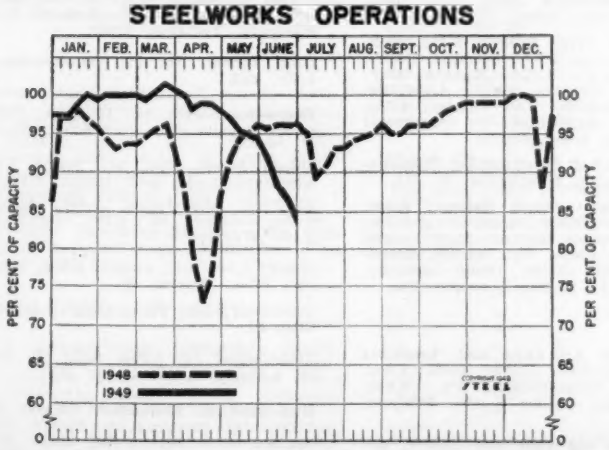
PRODUCTION—With demand slack, steelmaking operations are still declining slowly and indications are July melting schedules will fall to the lowest point in years, barring strike periods. Should threatened labor trouble develop, the steel rate next month may fall even lower than is now anticipated. Last week the national ingot rate dropped two points to 84.5 per cent of capacity. Excluding declines due to strikes, holidays or the reconversion period at the end of the war, this is the lowest rate recorded in nine years. Since mid-March the ingot rate has fallen 17 points, equivalent to nearly 17 million tons on an annual production basis. The most recent similar decline, except for reasons stated above, occurred in early 1940, but since then steel producing capacity has been enlarged greatly, the tonnage produced last week being 238,200 tons greater than could have been turned out by the furnaces in 1940 operating at the same percentage of the capacity then.

DELIVERIES—Reflecting the better balance between supply and demand as the first half of the year comes to a close is the fact delivery time has been shortened noticeably on practically all products. Only on a few items will the mills enter third quarter with substantial arrearages, chiefly in the flat-rolled products and certain pipe items. Galvanized sheets appear in most stringent supply, some sellers of this product requesting at least two months for delivery. Cold-rolled and enameling sheets also are not as freely available as are other products. Most mills, however, can accept hot-rolled sheet tonnage for July delivery. In most products the mills have virtually abandoned the customer quota system and indications are it will be a thing of the past by end of the summer. At the same time, voluntary allocations under government sponsorship will end Sept. 30, Commerce Secretary Sawyer indicating no effort will be made to extend the allocations law which expires on that date.

PRICES— While the general undertone of the steel markets pricewise is weak, no sign has yet appeared that any industry-wide downward revision in the established price structure is in the offing. In fact, steelmakers continue to insist significant revisions in prices are out of the question in view of high production costs which are intensified per ton of output with each point drop in production rates. Consumers, however, are holding to the belief substantial downward adjustments will come before too long, though likely not until after the steel wage question has been definitely settled.

COMPOSITES—STEEL's composite on steelmaking scrap declined to $20.17 last week, the lowest level attained since November, 1946, when OPA ceilings were still in effect. Still lower prices appear to be in the wind. In the preceding week scrap stood at $21.25, and it was $40.27 a year ago. The semifinished steel composite also dropped last week, failing to $63.12 from $66.72 the week before and comparing with $68.62 in the like week of 1948. The finished steel composite held unchanged at $91.82, as did that on steelmaking pig iron at $45.60.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended June 25	Change	Same Week 1948	Same Week 1947
Pittsburgh	81.5	— 1*	93	99.5
Chicago	95.5	— 1	96	95.5
Eastern Pa.	80.5	— 2.5	90.5	93
Youngstown	88	— 1	103	93
Wheeling	66	— 3	96.5	93.5
Cleveland	88.5	— 3*	94.5	91
Buffalo	91	None*	99	88.5
Birmingham	100	None	100	99
New England	58	None	81	90
Cincinnati	91	— 6	102	87
St. Louis	82	+15.5	89.5	84.5
Detroit	103	+ 2	103	88
Western	82	— 1	..	..
Estimated national rate	84.5	— 2	96	96.5

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. * Revised.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	June 25	June 18	Month Ago May 1949	Year Ago June 1948	5 Years Ago June 1944
Finished Steel	$91.82	$91.82	$93.36	$80.27	$56.73
Semifinished Steel	63.12	66.72	66.72	68.62	36.00
Steelmaking Pig Iron	45.60	45.60	45.66	40.49	23.00
Steelmaking Scrap	20.17	21.25	22.29	40.67	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

May 1949	3.98873c
Apr. 1949	4.02031c
Mar. 1949	4.05098c
May 1948	3.58321c
May 1944	2.44428c

* **STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

† **FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip, May, 1949, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	June 25, 1949	May 1949	Mar. 1949	June 1948
Steel bars, Pittsburgh mills	3.35c	3.35c	3.43c	2.875c
Steel bars, del. Philadelphia	3.8164	3.8164	3.8164	3.365
Steel bars, Chicago mills	3.35	3.35	3.35	2.875
Shapes, Pittsburgh mills	3.25	3.25	3.275	2.775
Shapes, Chicago mills	3.25	3.25	3.25	2.775
Shapes, del. Philadelphia	3.4918	3.4918	3.4918	2.98
Plates, Pittsburgh mills	3.40	3.40	3.50	2.925
Plates, Chicago mills	3.40	3.40	3.40	2.925
Plates, del. Philadelphia	3.5848	3.6348	3.7256	3.21
Sheets, hot-rolled, Pittsburgh mills	3.25	3.25	3.275	2.775
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.50
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.775
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.50
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.90
Strip, hot-rolled, Pittsburgh mills	3.25	3.25	3.40	3.05
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.775
Bright basic, wire, Pittsburgh	4.15	4.15	4.255	3.725
Wire nails, Pittsburgh mills	5.15	5.15	5.525	5.125
Tin plate, per base box, Pitts. dist.	$7.75†	$7.75†	$7.75†	$6.70

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$60.00
Slabs, Chicago	52.00	52.00	52.00	45.00
Rerolling billets, Pittsburgh	52.00	52.00	56.20	45.00
Wire rod 7/32 to ¼-inch, Pitts. dist.	3.40c	3.775c	3.775c	3.175c

* Nominal. † 1.50 lb coating.

Pig Iron

	June 25, 1949	May 1949	Mar. 1949	June 1948
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$44.08
Basic, Valley	46.00	46.00	46.00	39.00
Basic, eastern, del. Philadelphia	49.39	49.39	50.3002	42.17
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	43.58
No. 2 fdry., del. Philadelphia	49.89	49.89	50.8002	42.67
No. 2 foundry, Chicago	46.25	46.25	46.25	39.00
No. 2 foundry, Valley	46.50	46.50	46.50	39.50
Southern No. 2 Birmingham	39.38	39.88	43.38	39.38
Southern No. 2 del. Cincinnati	45.43	45.93	49.43	45.09
Malleable, Valley	46.50	46.50	46.50	39.50
Malleable, Chicago	46.50	46.50	46.50	39.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	66.00	58.00
Ferromanganese, f.o.b. Etna, Pa.	175.00	175.00	170.20	151.15*

* F.o.b. cars Pittsburgh.

SCRAP

Heavy melt. steel, No. 1, Pittsburgh	$23.00	$23.25	$36.30	$40.25
Heavy melt. steel, No. 2, E. Pa.	17.00	19.56	29.80	39.00
Heavy melt. steel, No. 1, Chicago	19.50	21.50	33.30	39.25
Heavy melt. steel, No. 1 Valley	22.00	22.00	35.85	40.25
Heavy melt. steel, No. 1 Cleveland	18.50	18.50	34.10	39.75
Heavy melt. steel, No. 1, Buffalo	19.75	22.81	35.95	43.00
Rails for rerolling, Chicago	27.75	27.75	43.85	53.75
No. 1 cast, Chicago	25.50	27.50	39.20	68.38

COKE

Connellsville, beehive furnace	$13.50	$14.25	$14.50	$13.00
Connellsville, beehive foundry	16.25	16.75	17.00	15.22
Chicago, oven foundry, ovens	20.00	20.40	20.40	19.50

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, nominal. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except: $57, Conshohocken, Pa.; $71, Fontana, Calif.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $63, Conshohocken, Pa.; $80, Fontana, Calif.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $65, Conshohocken, Pa.; $82, Fontana, Calif.

Sheet Bars: Nom., per net ton, mill; sales in open market $55-$60 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅜-inch, inclusive, 3.40c per lb, mill, except: 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Los Angeles. Basic open-hearth and bessemer, 7/32 to 47/64-in., inclusive, 3.50c, Sparrows Point, Md.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill, except: 3.50c, Atlanta; 3.55c, Ecorse, Mich.; 3.75c, Houston; 3.95c, Kansas City; 4.00c, Fontana, Calif.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif.; Portland, Oreg., Seattle; 4.25c, Minnequa, Colo.

Rail Steel Bars: (Base 10 tons): 3.35c Huntington, W. Va., and Moline, Ill.; 4.00c, Williamsport, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 4.75c, Fontana, Calif.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.48c, Camden, N. J.; 5.40c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.30c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.50c, Atlanta; 4.00c, Fontana, Calif.; 3.75c, Houston; 3.95c, Kansas City; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 3.85c, Williamsport, Pa., mill; 3.35c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa.; 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.45c, Ecorse, Mich.; 3.65c, Houston; 3.35c, Conshohocken, Pa.; 3.95c, Pittsburg, Torrance, Calif.; 4 .15c, Fontana, Calif.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 5.05c, Torrance, Calif.; 5.25c, Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich., Granite City, Ill.; 4.90c, Fontana, Calif.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 4.80c, Kokomo, Ind.; 5.15c, Pittsburg, Torrance, Calif.

Galvannealed Sheets: 4.95c, mill, except: 5.30c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill., Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 5.95c, Warren. Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.45c, Warren, O.

Motor: 6.70c mill, except: 6.90c, Granite City, Ill.; 7.20c, Warren, O.

Dynamo: 7.50c, mill, except: 7.70c, Granite City, Ill.

Transformer 72, 8.05c, mill; 65, 8.60c, mill, 58, 9.30c, mill, 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.15c, Ecorse, Mich. Galvanized (No. 10), 6.75c, mill. Cold-rolled, 6.05c, mill, except: 6.25c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.40c, Atlanta; 3.45c, Ecorse, Mich.; 3.60c, Detroit; 3.65c, Houston; 3.85c, Kansas City, Mo.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, San Francisco, Los Angeles; 4.30c, Minnequa, Colo.; 4.40c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

Cold-Rolled Strip (0.25 carbon and less); 4.00c, mill, except: 4.00-4.25c, Warren, O.; 4.00-4.50c, New Castle, Pa., Youngstown; 4.15c, Riverdale, Ill.; 4.20c, Ecorse, Mich.; 4.25-4.45c, Detroit; 4.50c New Haven, Conn., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.85c, Wallingford, Conn.; 4.90c, Fontana, Calif.; 5.75c, Los Angeles. One company quotes 4.50c, Pittsburgh base; another, 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.25-4.50c, New Castle, Pa.; 4.50c, Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton and Harrison, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton and Harrison, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.15c, Ecorse, Mich. Cold-rolled, 6.05c, mill, except: 6.25c, Ecorse, Mich.

Tin, Terne, Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $7.50-$7.70; 1.50 lb coating $7.75-$7.95. Pittsburg, Calif., mill $8.25 and $8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $6.45-$6.65; 0.50 lb tin, $6.70-$6.90; 0.75 lb tin, $7.00-$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight $5.75-$5.85. Pittsburg, Calif., mill, $6.50.

Holloware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.40c, Sparrows Point, Md.; 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $6.65, except: $6.75 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $17.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.50c, Coatesville, Pa., Claymont, Del., Conshohocken, Pa., Harrisburg, Pa.; 3.65c, Ecorse, Mich.; 3.80c, Houston; 4.00c, Fontana, Calif.; 4.30c, Seattle, Minnequa, Colo.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 4.50c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.40c, Ecorse, Mich.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 3.65c, Houston; 3.80c, S. San Francisco, Fontana, Calif.; 3.85c, Kansas City, Mo., Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, Los Angeles.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Minnequa, Colo., Atlanta, Buffalo; 4.75c, Kansas City Mo.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco. One producer quotes 4.15c, Chicago base; another, $4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.65c, Sparrows Point, Md.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., Kokomo, Ind.; 4.95c, Atlanta; 5.10c Worcester, Mass.; 5.15c, Minnequa, Colo., 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 4.80c, Chicago and Pittsburgh base; another, 5.20c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md., Kokomo, Ind.; 5.40c, Atlanta; 5.55c, Worcester, Mass.; 5.60c, Minnequa, Colo.; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.25c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Col. 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind., Atlanta; 109, Worcester, Mass.; 110, Minnequa, Colo., Cleveland; 123, Pittsburg, Calif. One producer quotes Col. 103, Chicago and Pittsburgh base; another, Col. 113, Crawfordsville, Ind.; 111 Houston, freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Col. 109, mill, except: 111, Kokomo, Ind., Atlanta; 116, Minnequa, Colo.; 132, Pittsburg, Calif. One producer quotes Col. 109, Pittsburgh and Chicago base; another, Col. 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Col. 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind., Atlanta; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes Col. 123, Chicago and Pittsburgh base.

Fence Posts (with clamps): Col. 114, Duluth; 121, Moline, Ill.; 122, Minnequa, Colo.; 125, Johnstown, Pa.; $120 per net ton, Williamsport, Pa.

Bale Ties (single loop): Col. 106, mill, except: 107, Atlanta; 108, Sparrows Point, Md., Kokomo, Ind.; 113, Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes Col. 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301	28.50	30.50	37.50
302	28.50	33.00	37.50
303	31.00	36.50	39.50
304	30.00	36.00	39.50
316	46.00	55.00	53.00
321	34.00	44.50	45.50
347	38.50	48.50	50.00

STRAIGHT CHROMIUM STEELS

410	22.75	26.50	32.00
416	23.25	28.25	32.50
430	23.25	27.00	34.75
446	32.50	60.00	46.50

STAINLESS-CLAD STEELS

	Plates —Cladding—		Sheets —Cladding—	
	10%	20%	10%	20%
302	....	....	19.75	21.50
304	22.50	26.50	20.75	22.50
310	32.50	36.50	....	....
316	27.00	31.00	26.00	28.00
321	23.50	27.50	....	....
347	25.00	29.00	24.00	26.00
405	18.75	24.75	....	....
410	18.25	24.25	....	....
430	18.25	24.25	....	....

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

For prices of bolts, nuts, rivets and washers please refer to June 20 issue, Page 155.

Tubular Goods

Standard Steel Pipe: Eastern mill carlot prices, threaded and coupled, to consumers about $200 a net ton. Discounts from base:

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	39½–	11–	1	46½–	30½–
	41½	13½		48½	33½
¼	37½–	13–	1¼	47–	31–
	39½	15½		49	34
⅜	34–	9½–	1½	47½–	31½–
	36	12½		49½	34½
½	41–	23½–	2	48–	32–
	43	26½		50	35
¾	44–	27½–	2½, 3..	48½–	32½–
	46	30½		50½	35½
			3½ & 4	44½	29

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	40½	25	38½	23	28–	12½–
					38½	23
2½	44½	29	41½	26	33½–	18–
					41½	26
3	44½	29	41½	26	36–	20½
					41½	26
3½&4	42½–	26–	43½	28	38½–	23–
	46½	31			43½	28
5 & 6	42½–	26–	43½	28	43½	28
	44½	29				
7	....	....	....	....	43½	27

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	40½	12½	1¼	46–	32–
¼	38½	14½		48	33
⅜	35	11½	1½	46½–	32½–
½	40–	24½–		48½	33½
	42	25½	2	47–	33–
¾	43–	28½–		49	34
	45	29½	2½ & 3.	47½–	33½–
1	45½–	31½–		49½	34½
	47½	32½	3½ & 4.	43½	28

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	39½	24	37½	22	27–	11½–
					37½	22
2½	43½	28	40½	25	32½–	17
					40½	25
3	43½	28	40½	25	35–	19½–
					40½	25
3½-4.	41½–	28½–	42½	27	37½–	22–
	45½	30			42½	27
5 & 6	41½–	28–	42½	27	42½	27
	43½	28½				
8	45½	29	44½	28	44½	28
10	45	28½	44	27½	44	27½
12	44	27½	43	26½	43	26½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

	Butt Weld			Lapp Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅜	+59	+90	1¼	+22	+47½
½	+20	+47	1½	+15½	+40
¾	+10	+36	2	+ 7½	+31
1 and			2½-3	+ 5	+26½
1¼	+ 4	+27	4	List	+20½
1½	— 2	+23½	4½-8	+ 2	+22
2	— 2½	+23	9-12.	+12	+31½

Boiler Tubes: Net base c.l. prices, dollars per 100′, mill; minimum wall thickness, cut lengths 4 to 24″, inclusive.

O.D.	B.W.	—Seamless—		Elec. Weld	
IN.	Ga.	H.R.	C.D.	H.R.	C.D.
1	13	11.50	13.39	13.00	13.00
1¼	13	13.62	15.87	13.21	15.39
1½	13	15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2½	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Pipe Cast Iron: Class B, 6-in. and over, $82.50-$93.50 per net ton, Birmingham; $87.50, Burlington, N. J.; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb mill, except: $3.30, Minnequa, Colo.
Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.
Light (rail steel): $3.55 per 100 lb, Williamsport, Pa., Huntington, W. Va.
Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.
Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Torrance, Calif.; 4.50c, Seattle.
Splice Bars: 4.25c, mill.
Standard Spikes: 5.35c, mill.
Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.5334	51.0334	51.5334	52.0334
Brooklyn, N. Y., del.	....	52.634	53.134	....
Birmingham, furnace	38.88	39.38	....	....
Cincinnati, del.	....	45.43	....	....
Buffalo, furnace	46.00	46.50	47.00	....
Boston, del.	54.92	55.42	55.92	....
Rochester, del.	47.95	48.45	48.95	....
Syracuse, del.	49.39	49.89	50.39	....
§**Chicago,** district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.82	47.82-48.32	48.32	48.82
Muskegon, Mich., del.	....	51.28-51.78	51.78	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.3002	48.8002	48.8002	49.3002
Duluth, furnace	....	46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace	....	52.50	53.00	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.0578	....	....
Portland, Oreg., del.	....	54.0578	....	....
Los Angeles, San Francisco	53.5578	54.0578	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65*	49.15*	49.65*	....
Ironton, Utah, furnace	47.00	47.50	....	....
Lone Star, Tex., furnace	46.00	†46.50	....	....
Gulf ports, del.	50.50	51.00	....	....
‡**Neville Island, Pa.,** furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	46.00	....	....	....
Swedeland, Pa., furnace	48.00	48.50	49.00	49.50
Philadelphia, del.	49.39	49.89	50.39	50.89
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.8230	51.3230	....	....
Troy, N. Y., furnace	48.00	48.50	49.00	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.1022	50.6022	50.6022	51.1022

* Including 3 per cent federal transportation tax.
† Low phosphorus southern grade.
‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaca; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.
§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)..$59.50
6.51-7.00.. 60.50 9.01- 9.50. 65.50
7.01-7.50.. 61.50 9.51-10.00. 66.50
7.51-8.00.. 62.50 10.01-10.50. 67.50
8.01-8.50.. 63.50 10.51-11.00. 68.50
8.51-9.00.. 64.50 11.01-11.50. 69.50
F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $78.50 furnace, Niagara Falls; $80 open-hearth and foundry grade, Keokuk, Iowa, or Wenatchee, Wash., freight allowed to normal trade area. 12½ lb piglets, $85, Keokuk, Iowa, freight allowed to normal trade area. Add $1 a ton for each additional 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 a ton for 0.45% max. P.

Charcoal Pig Iron

Semi-cold blast, low phosphorous. F.o.b. furnace, Lyles, Tenn.....$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., $54; Philadelphia, $56.9786 del. Intermediate phosphorus, Central furnace, Cleveland, $51.

Electrodes

(Threaded, with nipples, unboxed)

Diam. (Inches)	Length (Inches)	f.o.b. plant (Cents per lb)
Graphite		
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
8	48, 60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00
Carbon		
40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens	
Connellsville, furnace	$13.00-14.00
Connellsville, foundry	16.00-16.50
New River, foundry	18.00
Wise county, foundry	15.35
Wise county, furnace	14.60
Oven Foundry Coke	
Kearney, N. J., ovens	$22.00
Everett, Mass., ovens, New England, del.‡	22.70
Chicago, ovens	20.00
Chicago, del.	†21.45
Detroit, del.	23.76
Terre Haute, ovens	20.20
Milwaukee, ovens	20.75
Indianapolis, ovens	19.85
Chicago, del.	23.19
Cincinnati, del.	22.66
Detroit, del.	23.61
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens	20.90
Buffalo, del.	23.42
Cleveland, del.	22.55
Erie, del.	22.70
Birmingham, ovens	17.70
Philadelphia, ovens	20.45
Swedeland, Pa., ovens	20.40
Portsmouth, O., ovens	19.50
Detroit, ovens	20.65
Detroit, del.	•21.70
Buffalo, del.	22.75
Flint, del.	22.98
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45. ‡ Or within $4.03 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens (Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	19.00-23.50
Industrial xylol	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	$45.00
Per pound, ovens (Effective as of Oct. 1)	
Phenol, 40 (carlots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars (Effective as of Oct. 25)	12.50
Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.) Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.) Domestic dead-burned, ⅜" grains; Bulk, $30.50-31.00; single paper bags, $35.00-35.50.

Dolomite

(Base prices per net ton) Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural)
Lower Lake Ports

(Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.)

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

Long term contracts, involving large tonnages, prices are nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. United States ports; prices on lower grades adjusted to manganese content and impurities.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb, Mo., cont., Mines	$0.90

WAREHOUSE STEEL PRICES

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga. and Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H. R. Rds.	C. F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.00‡	6.51	7.15	5.82	...	5.77	6.56	8.68	5.53	5.90	7.36
New York (c'try)	5.80‡	6.31	6.95	5.62	...	5.57	6.36	8.48	5.33	5.70	7.16
Boston (city) ..	6.10‡	6.70**	7.16	5.80	...	5.67	6.42	8.72	5.57	5.95	7.40
Boston (c'try) .	5.95‡	6.55**	7.01	5.65	...	5.52	6.27	8.57	5.42	5.80	7.25
Phila. (city)...	5.80	6.39	6.73	5.55	...	5.55	6.09	8.00	5.25	5.50	6.70
Phila. (c'try)..	5.65	6.24	6.58	5.40	...	5.40	5.94	7.85	5.10	5.35	6.55
Balt. (city)....	5.46	6.36	7.06	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)...	5.31	6.21	6.91	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00‡	6.05**	7.85	5.49	6.50	5.20	6.05	10.13	5.25	5.50	7.06
Buffalo (w'hse)	4.85‡	5.90**	7.70	5.34	6.35	5.05	5.90	9.98	5.10	5.35	6.91
Pitts. (w'hse)..	4.85	5.75[10]	6.85-6.90	5.00	6.00	4.90	5.65	9.20††	4.90	5.05-5.10	6.55
Detroit (w'hse)	5.32	6.22[10]	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.80-6.91	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse).	4.85	5.75	6.65-6.76	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.26‡	5.94**	6.83	5.38	6.10	5.43	5.94	...	5.43	5.63	7.03
Chicago (city).	5.00-5.20‡	5.90[4]	6.95	5.00	6.67-6.83	5.05	5.60	7.85[5]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05‡	5.75[4]	6.80	4.85	6.52-6.68	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee(city)	5.18-5.38‡	6.08[4]	7.13	5.18	6.82-7.01	5.23	5.78	8.03[5]	5.23	5.43	6.88
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
St. L. (w'hse).	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.15	6.15	6.55	5.15	...	5.15	6.83	...	5.15	5.30	7.62
Birm'ham(c'try)	5.00	6.00	6.40	5.00	...	5.00	6.68	...	5.00	5.15	7.47
Omaha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60	8.05**	8.20	6.80	9.50	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse)..	6.45	7.90**	8.05	6.65	9.35	6.10	8.05	...	5.95	6.15	8.05
San Francisco..	6.15[10]	7.50[3]	8.10	6.75[10]	8.25[3]	5.90[10]	7.55	10.85[2]	5.90	6.35	8.10
Seattle-Tacoma.	6.70[7]‡	9.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.35	6.30[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 17 gage; ††as annealed.

Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 9999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

PRICES OF LEADING FERROALLOY PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.ob. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10 % C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5 for max 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, corload, lump, bulk, max, 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe), Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si; packed 19.90-21.70c; ton lot 21.00-22.60c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5 per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15c per lb of contained Si, carload packed 15.9, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.) C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr.) Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(**Small size**—weighing approx, 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

For prices of other ferroalloy products please refer to June 20 issue, Page 178.

Advises Caution in Buying Metals

Market experts give purchasing agents detailed reports on present conditions in nonferrous metals. Copper prices drop ½-cent further to 16-cent basis

New York—With copper dropping ½-cent further to the basis of 16.00c, delivered Connecticut Valley, on June 17, the market is now only 1.62½ cents a pound above the final OPA ceiling set in the last half of 1946 before the price fixing agency lapsed. The wartime base ceiling for copper was 12.00c a pound, but as high as 26.00c or 27.00c a pound was paid some high-cost producers through the premium payment program. Several producers have curtailed production, and further cuts are in prospect. Phelps Dodge Corp. will reduce its copper smelter operations at Douglas, Ariz., about two-thirds June 27, or about 5000 tons monthly.

Lead and zinc prices held unchanged last week, although buying showed improvement only in the former metal. Anaconda Copper Mining Co. has closed a zinc mine at Butte, Mont., and a zinc-lead mine at Darwin, Calif.

In view of the sharp price declines in copper, lead and zinc since mid-March, metalworking industries are watching developments closely. The opinions expressed on the outlook for nonferrous metals at the 34th annual international convention of the National Association of Purchasing Agents in Chicago June 21 are enlightening. A brief summary of the individual statements follows:

Aluminum (Thomas D. Jolly, vice president, Aluminum Co. of America)—Aluminum has been the last of the nonferrous metals to encounter a definite slackening in demand, as consumers are now reducing greater than normal inventories. This is believed to be only a temporary situation as the combination of many new uses plus the expansion of old uses will create an excellent demand for aluminum following the present readjustment period. Due to the fact that the price was held to a range of 15.00c to 17.00c per pound, when secondary ingot was selling from 5 cents to 10 cents over new metal, the industry says it is in a difficult position to reduce prices.

Copper (A. C. Bull, Pioneer Service & Engineering Co., Chicago, and Henry R. Michel, Westinghouse Electric Corp., East Pittsburgh, Pa.)—The price of copper seems to be levelling off at the present level of 16.00c, but no prospects are seen for an immediate pickup in fabricators' demand. Copper prices are now believed at a proper level in comparison to other commodities and additional cuts probably would be due only to causes outside the industry. Buyers have now been holding off for about two months and their inventories should be getting in fairly good shape, but in view of the present frame of mind of buyers nothing more is expected than hand-to-mouth buying for some time. Recent unfavorable statistics, showing the drop in demand for refined copper and the increase in refiners' stocks are only partly tempered by progress in cutting back production. Production outside the United States is currently being cut sharply. Stockpiling is currently done at a rate of about 25,000 tons a month but a further increase in this rate of buying is expected.

Brass and Bronze (Wallace B. Burnet, Imperial Brass Mfg. Co., Chicago)—Recent declines in brass ingot prices were due not only to the drop in copper but partly to the fact that one large factor in the market was caught with excessively large inventories of scrap. This may mean that any additional copper cut might not be followed by another automatic reduction in brass ingot prices. While a cautious buying policy seems indicated, it should not be overlooked that the market may become vulnerable on the upside if a large number of buyers should decide to step up purchases all at once and clamor for immediate delivery.

Lead (J. J. Sharkey, Western Cartridge Co. Division, Olin Industries, East Alton, Ill.)—While peacetime demands for lead probably will not again equal the postwar years of 1946 through 1948, there is some opinion that the consumers of lead will again enter the market in good volume sometime during the third quarter of this year. The government is expected to continue to purchase lead for the permanent stockpile and these purchases may be stepped up moderately. However, indications are that supplies will remain ample for all demands, at least during the balance of this year. It is probable that the import duty on lead will be restored but foreign lead should continue to be available for delivery here.

Zinc (J. J. Sharkey)—Conditions are quite similar to those in the lead market. There is some opinion in the mining industry that at reduced price levels many mines will be compeled to suspend operations thus cutting down domestic supplies. The import duty on zinc is expected to be continued but zinc of foreign origin will remain available.

Magnesium (Charles S. Frink, Dow Chemical Co., Texas Division, Freeport, Tex.)—Magnesium prices are not expected to recede greatly from present levels as improved know-how is constantly offset by increased costs, notably power and labor. However, prices of fabricated articles made of magnesium are expected to decline. As production can be increased rapidly and economically, there is no prospect of supply shortages.

Cadmium (Roy F. Stiles, Stewart-Warner Corp., Chicago)—Producers of cadmium believe the reduction in domestic demand will be offset by larger stockpiling and increased export quotas. Stockpiling purchases for next year are scheduled at three times this year's rate. They say these factors will suffice to hold prices. Commodity analysts, on the other hand, believe that during a period of basic correction it is a mistake to consider any commodity immune from a decline. Caution is advised.

Nickel (Roy F. Stiles)—With producers and analysts disagreeing on the market outlook, the best advice that we can give is to maintain reasonable inventory, watch the market closely and keep in a position to liquidate present inventories over a short period to take advantage of any decline.

Tin (C. A. Ilgenfritz, United States Steel Corp., Pittsburgh)—Output of tin in 1950 may be restored to prewar levels, unless upset by new disturbances in the Far East. This year it is estimated at 170,000 tons. World consumption has eased off, particularly in the U. S., but this has been partly by considerable transfers into the permanent stockpile. Chances are that tin controls will be extended another year until June, 1950. Some industries, such as custom jewelry, still are not getting all the tin they want.

International Tin Control

London—International Tin Study Group, warning that world production of tin is far outstripping its commercial use, has established a "working party" to frame new proposals for an international commodity agreement. The group may seek an international commodity control conference to be convened by the secretary general of the United Nations. It is estimated that production will total 170,000 tons of tin in 1949, 190,000 tons in 1950 and 205,000 tons in 1951 while consumption is estimated at 138,000 tons, 158,000 tons, and 162,500 tons, respectively.

Authorizes Metal Purchases

Washington—Economic Cooperation Administration has authorized Marshall Plan countries to purchase $345.5 million worth of nonferrous metals through June 1, 1949. Authorizations for copper purchases led the list with $157.7 million; aluminum was $63.8 million; zinc, $55.1 million; lead, $49.9 million; brass and bronze, $7.5 million; nickel, $5.6, and all others, $5.9 million.

In addition to the authorization figures, ECA also released today a report on nonferrous metals covering world production-consumption in 1948 which stated that no substantial increases in world production can be hoped for before 1952-53, although production is now considerably above prewar averages and some further gains may be expected in the near future.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic 16.00c, Conn. Valley; Lake, Nom., Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 14.25-15.50c; 88-10-2 (No. 215) 23.50c; 80-10-10 (No. 305) 20.00c; No. 1 yellow (No. 405) 12.00-13.25c.

Zinc: Prime western 9.00c, brass special 9.25c, intermediate 9.50c, East St. Louis; high grade 10.00c, delivered.

Lead: Common 11.85c; chemical, nom.; corroding, 11.95c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 15.50-15.75c; No. 12 foundry alloy (No. 2 grade) 14.25-14.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 15.50-15.75c; grade 2, 14.50-14.75c; grade 3, 13.50-13.75c; grade 4, 12.50-12.75c. Prices include freight at carload rate up to 75 cents per 100 lb.

5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $80-$83 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 71.50c per ounce.

Platinum: $69-$72 per ounce.

Palladium: $24 per troy ounce.
Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 30.68; yellow brass 26.77; commercial bronze, 95%, 29.68; 90%, 29.28; red brass, 85%, 28.36; 80%, 27.97; best quality, 27.56; nickel silver, 18%, 40.57; phosphor-bronze, grade A, 5%, 48.92.

Rods: Copper, hot rolled 26.53; cold drawn 27.78; yellow brass, free cutting, 21.34; commercial bronze, 95% 29.37; 90% 28.97; red brass 85% 28.05; 80% 27.66.

Seamless Tubing: Copper 29.72, yellow brass 29.78; commercial bronze 90% 31.94; red brass 85% 31.27; 80% 30.88.

Wire: Yellow brass 27.06; commercial bronze, 95% 29.97; 90% 29.57; red brass, 85% 28.65; 80% 28.26; best quality brass 27.85.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots, 21.80, l.c.l. 22.42½, c.l. 21.92½; weatherproof, f.o.b. eastern mills, 100,000 lb lots, 23.97½, l.c.l. 24.72½, c.l. 24.22½; magnet, delivered, c.l. 26.00, 15,000 lb or more 26.25, l.c.l. 26.75.

ALUMINUM

Sheets and Circles: 2s and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and Bends: List price plus 45%.

ZINC

Sheets, 14.25c, f.o.b. mill, 36,000 lb and over, Ribbon zinc in coils, 13.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 12.50c; over 12-in., 13.50c.

NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
May Avg..	18.045	13.566	11.880	103.000	17.000	38.500	40.000	71.500
Apr. Avg..	21.774	15.017	14.085	103.000	17.000	38.500	40.000	71.500
June 1 ...	17.625	11.85	11.00	103.00	17.00	38.50	40.00	71.50
June 2-7 ..	17.625	11.85	10.75	103.00	17.00	38.50	40.00	71.50
June 8 ...	17.000	11.85	10.00	103.00	17.00	38.50	40.00	71.50
June 9-11 .	17.000	11.85	9.50	103.00	17.00	38.50	40.00	71.50
June 13-14.	16.500	11.85	9.50	103.00	17.00	38.50	40.00	71.50
June 15-16	16.500	11.85	9.00	103.00	17.00	38.50	40.00	71.50
June 17-23	16.000	11.85	9.00	103.00	17.00	38.50	40.00	71.50

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9%, flake, f.o.b. Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.
Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 27.34c; oval 26.84c; cast 25.37c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 48.00c, f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,900 lb, 17.00c, f.o.b. Niagara Falls, N. Y.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over, 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb, 63.3c; 700 to 1900 lb, 60.9c; 2000 to 9900 lb, 59.1c; 10,000 lb and over, 58.00c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100-lb drums 42.50c, f.o.b. Cleveland; 43.00c, Detroit; 42.00c, Philadelphia.
Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, 97.00c; 100 lb kegs, 98.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	13.00	13.00	12.25
Yellow brass	10.50	10.25	9.62½
Commercial Bronze			
95%	12.12½	11.87½	11.37½
90%	11.87½	11.62½	11.12½
Red Brass			
85%	11.75	11.50	11.00
80%	11.50	11.25	10.75
Best Quality (71-80%)	11.50	11.25	10.75
Muntz Metal	9.75	9.50	9.00
Nickel, silver, 10%	12.62½	12.37½	6.31¼
Phos. bronze, A	14.87½	14.62½	13.62½
Naval brass	10.25	10.00	9.50
Manganese bronze	10.25	10.00	9.37½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, f.o.b. shipping point, carload lots)

No. 1 copper 12.00, No. 2 copper 11.00, light copper 10.00, composition red brass 9.50, radiators 7.25-7.50, heavy yellow brass 7.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 12.00, No. 2 copper 11.00, light copper 10.00, refinery brass (60% copper), per dry copper content 9.50-9.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 10.00-10.50, No. 2 9.00-9.50, light copper 8.00-8.50, No. 1 composition red brass 7.75-8.00, No. 1 composition turnings 7.25-7.50, mixed brass turnings 4.50-5.00, new brass clippings 9.00-9.50; No. 1 brass rod turnings 7.00-7.25, light brass 5.00-5.25, heavy yellow brass 5.00-5.25, new brass rod ends 7.00-7.25, auto radiators, unsweated 5.50-5.75, cocks and faucets 6.75-7.00, brass pipe 7.00-7.25.

Lead: Heavy 7.50, battery plates 4.50, linotype and stereotype 10.25-10.50, electrotype 7.50-8.00, mixed babbitt 10.50-11.00, solder joints, 10.50-11.00.

Zinc: Old zinc 3.00-3.50, new die cast scrap 3.00-3.50, old die cast scrap 2.00.

Tin: No. 1 pewter 52.00-54.00, block tin pipe 70.00-72.00, No. 1 babbitt 40.00-42.00.

Aluminum: Clippings 2S 9.50-10.00, old sheets 5.50-6.00, crankcase 5.50-6.00, borings and turnings 3.00-3.50, pistons, free of struts, 5.50-6.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt.	$23.00
No. 2 Heavy Melt.	21.00
No. 1 Busheling	21.00
No. 1 Bundles	23.00
No. 2 Bundles	19.00-19.50
No. 3 Bundles	18.00-18.50
Heavy Turnings	17.50-18.00
Machine Shop Turnings	14.50-15.50‡
Mixed Borings, Turnings	14.50-15.50‡
Short Shovel Turnings	18.00-18.50
Cast Iron Borings	18.00-18.50
Bar Crops and Plate	23.00-23.50
Low Phos. Steel	23.00-23.50

Cast Iron Grades†

No. 1 Cupola Cast	22.00-22.50
No. 1 Machinery Cast	27.00-27.50
Charging Box Cast	21.00-21.50
Heavy Breakable Cast	20.00-20.50
Brake Shoe	21.00-21.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	24.00
Axles	25.00-26.00
Rails, Random Lengths	23.50-24.00*
Rails, 2 ft and under	26.50-27.00
Rails, 18 in. and under	27.50-28.00
Railroad Specialties	25.50-26.50
Angles, Splice Bars	24.00-24.50

*Brokers' buying prices.
†Offering price.
‡ Crushers buying prices.

CLEVELAND

Heavy Melt. Steel	$18.00-19.00
No. 1 Busheling	18.00-19.00
No. 2 Bundles	16.00-17.00
Machine Shop Turnings	12.00-13.00
Mixed Borings, Turnings	17.50-18.00
Short Shovel Turnings	17.50-18.00
Cast Iron Borings	17.50-18.00
Bar Crops and Plate	19.50-20.50†
Punchings & Plate Scrap	19.50-20.50†
Cut Structurals	20.50-21.50†

Cast Iron Grades†

No. 1 Cupola	27.00-28.00
Charging Box Cast	22.00-23.00
Stove Plate	21.00-22.00
Heavy Breakable Cast	19.00-20.00
Unstripped Motor Blocks	18.00-19.00
Malleable	21.00-22.00
Brake Shoes	20.00-20.50
Clean Auto Cast	30.00-30.50
No. 1 Wheels	25.00-26.00
Burnt Cast	18.00-19.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00-21.00
R.R. Malleable	21.00-22.00
Rails, 3 ft and under	28.00-29.00
Rails, Random Lengths	24.00-25.00
Cast Steel	24.00-25.00
Railroad Specialties	24.00-25.00
Uncut Tires	23.00
Angles, Splice Bars	27.00

† Nominal.

VALLEY

Heavy Melt. Steel	$22.00†
No. 1 Bundles	22.00†
No. 2 Bundles	19.00†
Machine Shop Turnings	13.50-14.00†
Short Shovel Turnings	18.50-19.00†
Cast Iron Borings	18.50-19.00†
Low Phos.	23.00-23.50†

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.50-21.00

† Nominal.

MANSFIELD

Machine Shop Turnings	$13.50-14.00†
Short Shovel Turnings	17.50-18.00†

† Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$19.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	18.00
No. 1 Bundles	19.00
No. 2 Bundles	17.00
Machine Shop Turnings	8.00
Mixed Borings, Turnings	8.00
Short Shovel Turnings	8.00
Cast Iron Borings	9.00

Cast Iron Grades

No. 1 Cupola Cast	27.00
Charging Box Cast	21.00
Heavy Breakable Cast	18.00
Stove Plate	15.00
Unstripped Motor Blocks	15.00
Brake Shoes	15.00
Clean Auto Cast	27.00
Drop Broken Cast	30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
R.R. Malleable	17.00
Rails, Rerolling	21.00
Rails, Random Lengths	19.00
Rails, 18 in. and under	30.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 1 Bundles	$15.50-16.00
No. 2 Bundles	12.00-12.50
No. 2 Heavy Melt. Steel	12.50-13.00
No. 1 Busheling	15.50-16.00
Machine Shop Turnings	9.50-10.00
Mixed Borings, Turnings	9.50-10.00
Short Shovel Turnings	10.50-11.00
Cast Iron Borings	10.50-11.00
Punchings & Plate Scrap	15.50-16.00

Cast Iron Grades

No. 1 Cupola Cast	20.00-21.00
Heavy Breakable Cast	16.00-17.00
Clean Auto Cast	20.00-21.00

BUFFALO

No. 1 Heavy Melt. Steel	$19.50-20.00
No. 2 Heavy Melt. Steel	17.50-18.00
No. 1 Bundles	17.50-18.00
No. 1 Bushelings	17.50-18.00
No. 2 Bundles	15.50-16.00
Machine Shop Turnings	11.50-12.00
Mixed Borings, Turnings	15.00-15.50
Cast Iron Borings	15.00-15.50
Short Shovelings	15.50-16.00
Low Phos.	21.00-21.50

Cast Iron Grades

No. 1 Cupola Cast	24.00-25.00
Heavy Breakable	21.00-21.50
Malleable	22.00-22.50
Clean Auto Cast	26.00-26.50

Railroad Scrap

Rails, 3 ft. and under	29.00-30.00
Scrap rails	25.00-25.50
Rail Specialties	27.00-28.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	17.00
No. 1 Busheling	17.00
No. 1 Bundles	18.00
No. 2 Bundles	15.50
Machine Shop Turnings	11.00-11.50
Mixed Borings, Turnings	10.50-11.00
Short Shovel Turnings	13.00-14.00
Bar Crop and Plate	22.00-23.00
Punchings & Plate Scrap	22.00-23.00
Cut Structurals	22.00-23.00
Elec. Furnace Bundles	18.00
Heavy Turnings	18.00
No. 1 Chemical Borings	Nom.

Cast Iron Grades

No. 1 Cupola Cast	25.00
No. 1 Machinery Cast	27.00-28.00
Charging Box Cast	23.00-24.00
Heavy Breakable Cast	23.00-24.00
Unstripped Motor Blocks	19.00-20.00
Clean Auto Cast	27.00-28.00
No. 1 Wheels	27.00-28.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$12.50-13.00
No. 2 Heavy Melt. Steel	11.00
No. 1 Busheling	11.00
No. 1 Bundles	12.50-13.00
No. 2 Bundles	10.00-10.50
No. 3 Bundles	nominal
Machine Shop Turnings	5.00-7.00
Mixed Borings, Turnings	5.00-6.00
Short Shovel Turnings	7.00-8.00
Punchings & Plate Scrap	17.00
Cut Structurals	nominal
Elec. Furnace Bundles	17.00

Cast Iron Grades

No. 1 Cupola Cast	20.00-21.00
No. 1 Machinery	21.00-22.00
Charging Box Cast	18.00-18.50
Heavy Breakable	18.00-18.50
Unstripped Motor Blocks	nom.
Malleable	nom.

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$13.00-13.50
No. 2 Heavy Melt. Steel	10.50-11.50
No. 1 Bundles	12.00-13.00
No. 1 Busheling	9.50-10.00
Machine Shop Turnings	5.00-5.50
Mixed Borings, Turnings	4.50-5.00
Short Shovel Turnings	9.00-9.50
Bar Crops and Plate	14.00-15.00
Punchings & Plate Scrap	14.00-15.00
Chemical Borings	10.50-11.00

Cast Iron Grades

No. 1 Cupola Cast	19.00-20.00
Mixed Cast	18.00-19.00
Heavy Breakable Cast	17.00-18.00
Stove Plate	18.00-19.00
Unstripped Motor Blocks	16.00-17.00

CHICAGO

No. 1 Heavy Melt. Steel	$19.00-20.00
No. 2 Heavy Melt. Steel	17.00-18.00
No. 1 Bundles	19.00-20.00
No. 2 Bundles	16.00-17.00
No. 3 Bundles	13.00-14.00
Machine Shop Turnings	12.00-13.00
Mixed Borings, Turnings	10.00-11.00
Short Shovel Turnings	15.00-16.00
Cast Iron Borings	14.00-15.00
Bar Crops and Plate	20.00-21.00
Punchings	20.00-21.00
Elec. Furnace Bundles	20.00-21.00
Heavy Turnings	18.00-19.00
Cut Structurals	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast	27.00-28.00
Clean Auto Cast	27.00-28.00
No. 1 Wheels	27.00-28.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00-21.00*
Malleable	22.00-23.00
Rails, Rerolling	27.50-28.00
Rails, Random Lengths	22.00-23.00
Rails, 2 ft. and under	28.00-29.00
Rails, 18 in. and under	29.00-30.00
Railroad Specialties	24.00-25.00
Angles, Splice Bars	24.00-25.00

* Allocated.

ST. LOUIS

No. 1 Heavy Melt. Steel	$19.00-20.00
No. 2 Heavy Melt. Steel	17.00-18.00
Machine Shop Turnings	9.00-11.00
Short Shovel Turnings	9.00-11.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-26.00
Charging Box Cast	20.00-22.00
Heavy Breakable Cast	19.00-20.00
Brake Shoes	21.00-22.00
Clean Auto Cast	28.00-29.00
Burnt Cast	20.00-21.00

Railroad Scrap

R. R. Malleable	21.00-23.00
Rails, Rerolling	25.00-26.00
Rails, Random Lengths	21.00-22.00
Rails, 3 ft. and under	26.00-27.00
Uncut Tires	19.00-20.00
Angles, Splice Bars	26.00-27.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	18.00
No. 2 Bundles	16.00
No. 3 Bundles	14.00
Machine Shop Turnings	14.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings	15.00
Cast Iron Borings	15.00
Bar Crops and Plate	25.00-26.00
Cut Structurals	25.00-26.00

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Stove Plate	30.00-31.00
No. 1 Wheels	30.00-31.00

STEELMAKING SCRAP COMPOSITE

June 25, 1949	$20.17
June 18, 1949	21.25
May 1949	22.29
June 1948	40.67
June 1944	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00-21.00
R.R. Malleable	nominal
Rails, Rerolling	30.00-32.00
Rails, 3 ft. and under.	31.00-32.00
Angles and Splice Bars	31.00-32.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
Machine Shop Turnings	12.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Wheels	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$17.00
No. 2 Heavy Melt. Steel	17.00
No. 1 Bushelings	17.00
Nos. 1 & 2 Bundles	15.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	20.00
Cut Structurals	20.00
Elec. Furnace Bundles	25.00

Cast Iron Grades

No. 1 Cupola Cast	23.00
Heavy Breakable Cast	17.00
Stove Plate	20.00
Unstripped Motor Blocks	20.00
Malleable	23.00
Brake Shoes	23.00
Clean Auto Cast	20.00
No. 1 Wheels	22.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	22.00
Rails, Random Lengths	22.00
Angles and Splice Bars	22.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	28.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	25.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00
No. 2 Cast	44.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.

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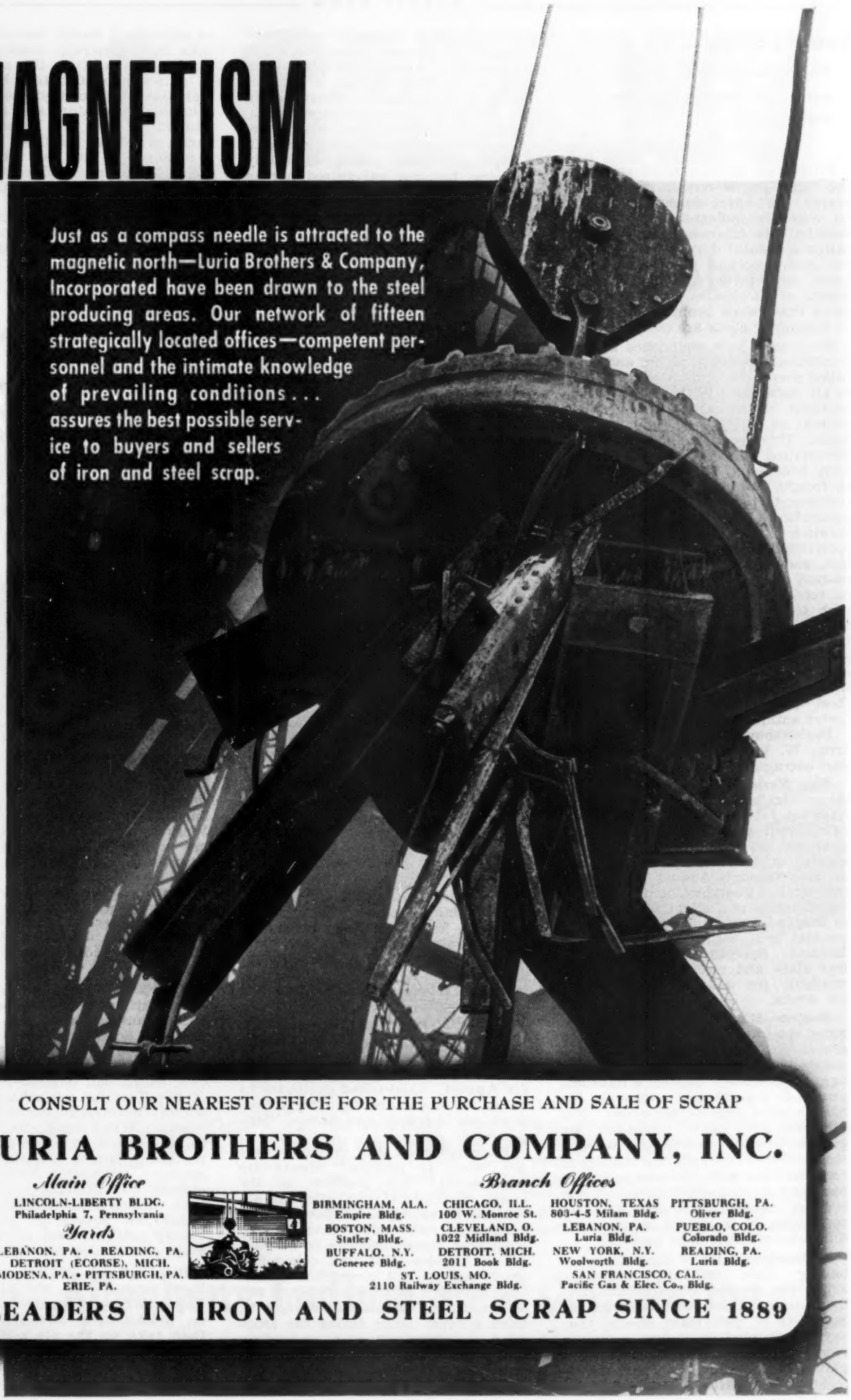
Just as a compass needle is attracted to the magnetic north—Luria Brothers & Company, Incorporated have been drawn to the steel producing areas. Our network of fifteen strategically located offices—competent personnel and the intimate knowledge of prevailing conditions . . . assures the best possible service to buyers and sellers of iron and steel scrap.



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Sheets Strip . . .

Galvanized sheet supply expected to remain tight for several months

Sheet Prices, Page 108

Pittsburgh — Galvanized sheets in the light gages remain in tightest supply of all sheet classifications, and no relief is indicated over coming months with increased tonnage allocation scheduled during third quarter for grain storage program. Deliveries on heavier gage galvanized sheets are available in a relatively short time, while promises on silicon or enameling stock are current.

Some mills have abandoned monthly allotment practice on hot and cold-rolled sheets, but this is not yet true in all instances. With these few exceptions, sellers are accepting new orders on first come first served basis. This does not mean that steel distribution has assumed prewar pattern, because of the sharp increases in freight rates and fact most mills continue to price product at point of production. Even should freight absorption in meeting competition be permitted through congressional action, some producing interests would sustain substantial losses in shipping to remote points due to prohibitive high freight rates. Sellers have reviewed entire customer list with this in mind as well as other "yardsticks" such as financial position of specific customers, type of fabricated product in relation to long term potential steel demand, and position of customer within its particular industry.

Parkersburg Steel Co., Parkersburg, W. Va., is now producing flat and corrugated galvanized sheets.

New York—While most sheet producers can still book hot rolled tonnage for July shipment, they are now fairly well booked up through August on cold-rolled and galvanized sheets; at least one mill is booked up also through August on enameling stock. Contributing to this latter situation is a slight improvement in demand from stove makers whose product is in somewhat more active demand. Specialties, such as stainless steel and electrical sheets, are available for delivery within about six weeks.

Boston—Many consumers of flat-rolled steel are convinced lower prices are ahead. This is influencing third quarter buying with commitments light beyond July; deliveries have improved to a point spot orders are the rule as users draw on inventory. Exceptions with some producers are galvanized and cold-finished carbon stock. There is some price shading in secondary markets. Narrow cold strip backlogs have melted to about the level of sheets while hot strip for converting is in ample supply with schedules of extras now uniform.

Philadelphia—Sheet consumers are having little difficulty obtaining shipments, except in galvanized and to a lesser degree, cold rolled sheets. Suppliers of galvanized sheets, they say, are behind on orders anywhere from eight to ten weeks. Light gage galvanized sheets are particularly tight. Most active consumers of uncoated sheets in this district are those engaged in pressed metal work for automobiles. Actually there has been little or no letup so far in requirements at these plants. Stovemakers are showing somewhat more life, although operations are still below average. Most sheet mills can still accept hot rolled tonnage for July delivery, but not galvanized nor in most cases cold rolled. Producers now also have little enameling stock available for July rolling.

Cleveland — All of Republic Steel Corp.'s flat-rolled products, except galvanized and enameling sheets, will be off quota limitations after August. Silicon and electrozinc sheets will be free from quotas after July, and hot and cold-rolled sheet and strip after August shipments.

One seller of flat-rolled products is expecting household equipment and appliance manufacturers to begin ordering steel in late August or September. One important producer of household equipment already has placed a substantial order for steel. Indicative, however, of the continuing effort to reduce inventories of finished goods, an appliance producer reports that of every three units it ships, two are from inventory and one is newly produced.

Chicago—Tightest steel product locally is galvanized sheets, overall demand far outstripping present production. One consumer in the building industry is enjoying unprecedented business at this time. Major part of his business now comes from repair and replacement business rather than new home construction. Container producers, while noting a slackening in operations, are keeping going at satisfactorily high levels. For the most part, demand for flat-rolled steel, while diminishing, is more insistent for prompt shipments, a demand which continues to be frustrated by a few producers here who have not been able to catch up with their accumulated orders and will have sizable carryovers into next quarter. These carryovers, plus current requirements of a diversity of metalworking companies, are expected to keep district operations at a comparatively high rate for some time to come. Latest to start production cutbacks is the farm implement industry, several members of which are now setting back delivery dates or trimming size of new orders.

Cincinnati — Sheet mill rolling schedules are filled for July, but customers are slow to enter specifications for August. Cold-rolled continues to be in better demand than hot-rolled. Stainless demand has turned progressively dull.

Birmingham — Mill interests here are "stocking nothing." Sheets are maintaining their position as the leader in demand, even with the additional tonnage gained through conversion to cold rolled. Even though somewhat easier, there is no surplus.

Los Angeles—Hot and cold-rolled sheets are on full production schedules, but mills anticipate this will not be the case in another 30 days, with third quarter order books far from filled. Galvanized and enameling sheets remain fairly tight, although supplies are steadily improving.

San Francisco—With the exception of galvanized sheets, flat-rolled products have generally reached a supply-demand parity in this area. Within a month, distributors believe the tightness in galvanized sheets will be relieved. Fabricators still are buying cautiously, and are keeping inventories as light as possible.

Kaiser Co. Inc. has reduced hot-rolled strip prices 25 cents per 100 pounds, effective as of June 10, to $4.40, f.o.b. Fontana, Calif.

Kaiser Co. Inc. has reduced universal mill plates 5 cents per 100 pounds effective as of June 10, to $4.30, f.o.b Fontana, Calif.

Plates . . .

Plate demand is light. Quick deliveries unlikely, however, until vacations are over

Plate Prices, Page 109

Philadelphia — Plate demand is light, and most tonnage is wanted immediately. For instance, various demands are for shipment within two weeks, and in some cases they are being met. However, with rolling schedules being somewhat upset next month by vacations, quick deliveries may be more difficult to obtain for a while, at least for some mills. Recent pressure for fast shipment may have been due in part to prospects of production soon declining not only because of vacation-taking, but possibly because of later labor disruptions. Alan Wood Steel Co., Conshohocken, Pa., will close down its open hearth and blooming mill departments for the first two weeks of July for mass vacations, its plate mills closing for a similar period later in the month, and its sheet mill for the first two weeks in August. Lukens Steel Co., Coatesville, Pa., has closed its 120-inch mill and 112-inch breakdown mill June 20 for two weeks for repairs. Workers are taking vacations. There are no plans, however, for the early suspension of the larger units. Worth Steel Co., Claymont, Del., in addition to closing down its heavier mill for the first week in July for vacations and its lighter mill for the first two weeks, is also understood to be planning to close down its open hearth department for a week.

New York—Plate sellers generally are entering the new quarter without arrearages for the first time since prewar. Some mills are able to roll a little tonnage for delivery before the end of July, although at least two, which will be closed down part of the time for mass vacations, are out of the market for most of that month. While consumer stocks are being worked off gradually, no important upturn in demand is in early prospect, especially with the price outlook still beclouded. There have been various adjustments in premium prices, but buyers are moving cautiously until at least after the steel wage controversy has been settled.

Birmingham — Plate production here remains at virtual capacity. Shipbuilding and repairs have stepped in, momentarily at least, to more than take up the slack in other industries. Result is that mills last week said "we have no plates."

Los Angeles—With one notable

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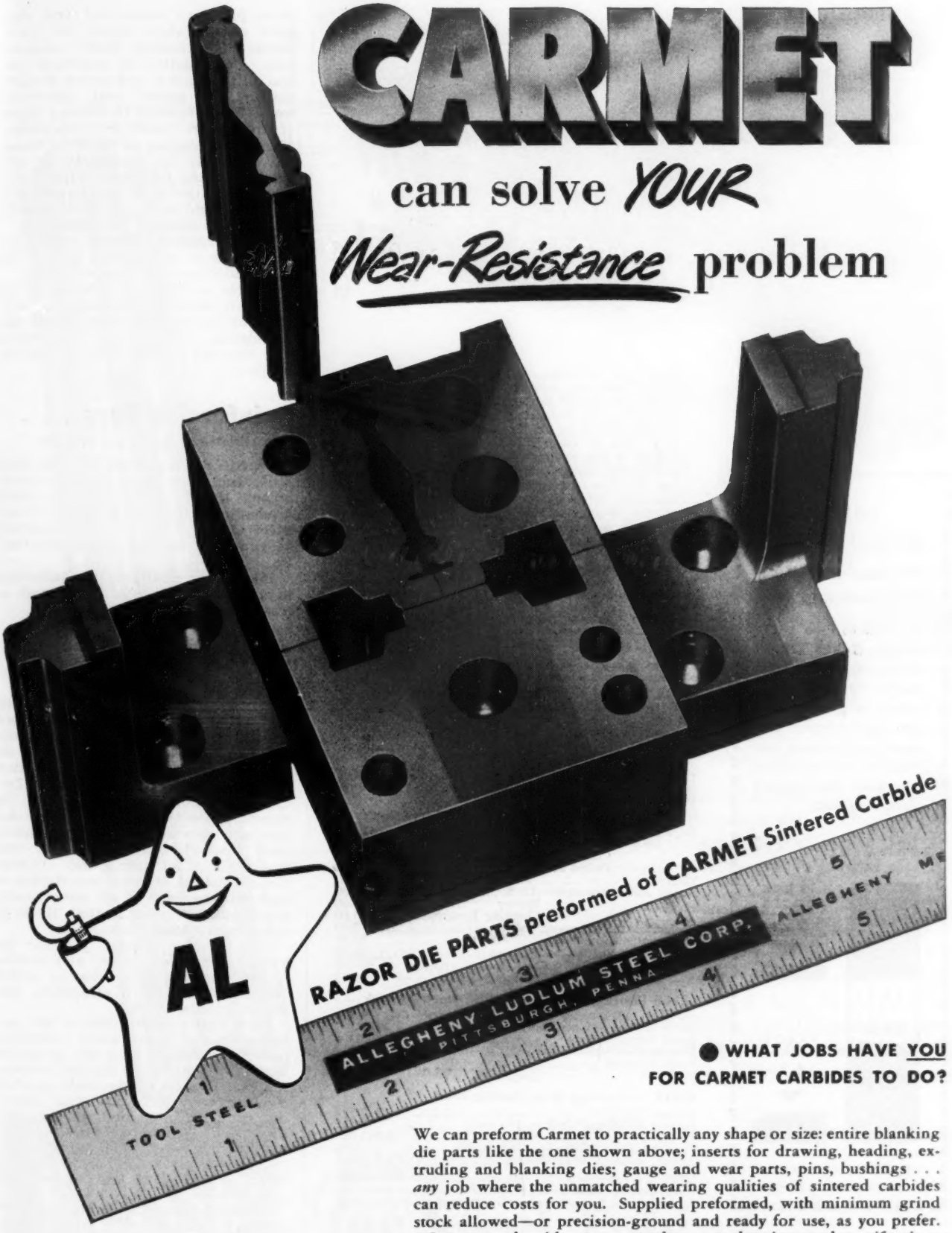

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Handling conditions vary for each particular plant. Your own problem should be presented to an experienced material handling engineer. However, the following example outlines a simple method for determining the savings possible with an electric industrial truck. Let us assume a hypothetical plant with the simple problem of transporting daily 180 tons of material 200 feet from stockrooms to processing machines. Without power trucks this would require 10 truckers, each making 10 round trips per hour, or 80 trips per day, carrying 450 lbs. of material per load.

TABLE I—*Handling Costs Without Electric Truck*

Based on 180 tons per day	*Cost per day*	*Cost per ton*
Labor (85¢ per hour)	$68.00	$0.378
Social Security Taxes	2.72	0.015
Workmen's Compensation	1.00	0.006
Hand Truck Depreciation	0.30	0.002
Total	$72.02	$0.401

In order to mechanize handling operations, the following equipment would be required:

TABLE II—*Cost of Equipment for Mechanizing*

Fork Lift Truck 2000-lb. capacity	$4,100.00
Battery	600.00
Charging Equipment	840.00
200 pallets	700.00
Total	$6,240.00

The truck, handling one-ton pallet loads of material, making 24 round trips per hour, could transport the 180 tons in 7½ hours.

TABLE III—*Annual Expense—Truck Operation*

Depreciation—Truck at 10%	$410.00
Battery at 20%	120.00
Charging equipment at 6⅔%	56.00
Pallets at 20%	140.00
Tires	100.00
Repair and Maintenance—Truck	164.00
Battery	24.00
Charging Equipment	33.60
Replacement of damaged pallets	70.00
Electricity	82.00
Insurance	10.00
Total annual expense	$1,209.60
Expense per day	4.03

TABLE IV—*Handling Costs—With Electric Truck*

Based on 180 tons per day	*Cost per day*	*Cost per ton*
Labor (Driver—$1 per hour)	$8.00	$0.044
Social Security Taxes	0.32	0.002
Workmen's Compensation	0.16	0.001
Truck Expense	4.03	0.022
Total	$12.51	$0.069

TABLE V—*Savings With Electric Truck*

Savings Per Ton	$ 0.332
Savings Per Day (Handling 180 tons)	59.51
Savings Per Year (300 days)	17,853.00
Per Cent Reduction in handling costs	83%
Annual earnings on investment	286%

While this example is obviously oversimplified, Baker Material Handling Engineers are prepared to show you how similar savings can be made on handling operations in your plant.

COST OF MATERIAL HANDLING

Per ton—based on 180 tons per day

In addition to these savings, Baker Trucks reduce warehouse rental charges by tiering, contribute to plant safety, speed production and material movement, and perform many other operations that reduce plant overhead.

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Baker INDUSTRIAL TRUCKS

price premium abandoned and supplies considerably better, the plate market is becoming more competitive. Construction of important gas and oil pipelines is sustaining present demand for plates, with municipal water lines expected to take up much of the future slack as it develops. Many communities on the West Coast have already let contracts or are drawing plans for water supply and pipeline projects to be constructed this year and next. A wide variety of plates is required for these jobs.

San Francisco—Heavy plates remain scarce, but lighter gages are fairly adequate for most demands.

Seattle — Plate fabricating shops have fair backlogs, although the outlook for the smaller shops is not too promising. The larger fabricators are figuring a number of major projects.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 108

Seattle — Northwest Steel Rolling Mills Inc., this city, is still strikebound, thereby reducing area steel production. Bethlehem Pacific Coast Steel Corp.'s plant here is operating at capacity, backlog being substantial.

Inquiry for small lots of reinforcing is steady and the total of business in less than 100 tons each is heavy.

Steel Bars . . .

Bar Prices, Page 108

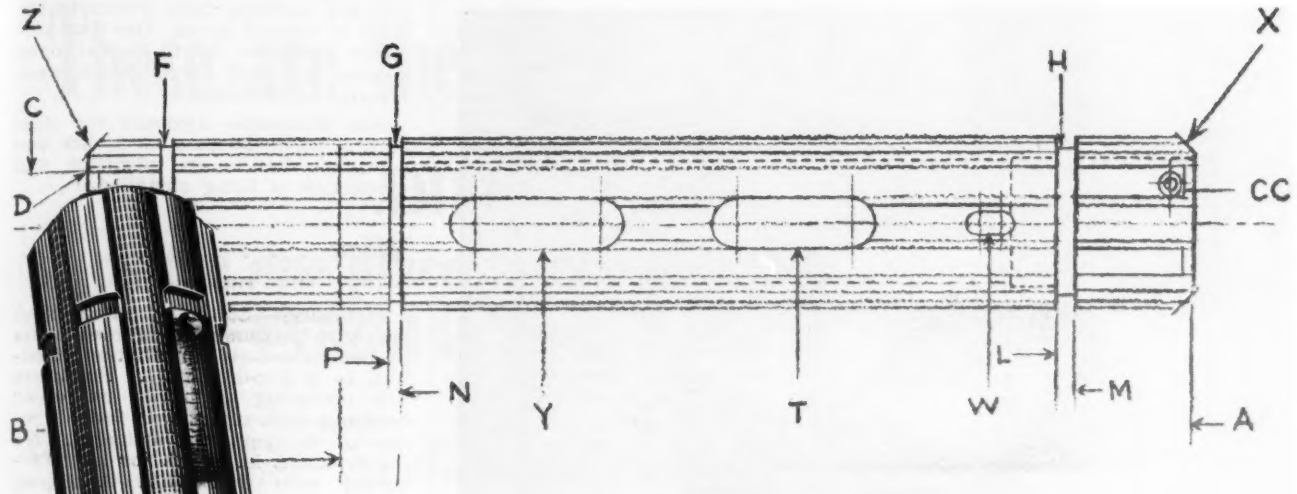
Boston—Not much improvement in carbon bar demand is expected before late third quarter. Meanwhile schedules for that period are wide open on more sizes and grades with production of cold-finished stock downward. Demand for hot-rolled is affected by slower operations by converters. Alloys are also slow with distributors well stocked with machinery, tool and other steel specialties. Indications are that current inventories of bars will be worked off more slowly over next two months than those of other major steel products.

One of the largest postwar inquiries for buoy chain and bridles includes about 1500 tons on which the Coast Guard, Washington, has received bids.

New York—Most sellers of hot carbon bars can make some shipments in July, although they are gradually building up backlogs for the remaining two months of the third quarter. Few, if any, mills are now behind on commitments, and the market likely will remain sluggish throughout the summer. This same situation and outlook applies to cold-finished carbon bars and to hot and cold alloy bars.

Philadelphia—Hot carbon bars are still available for July, with demand off substantially from a few months ago. Nevertheless, a fair amount of tonnage is still being moved. Certainly demand hasn't shrunk to a point where district consumers can get all the tonnage they require from nearby mills.

Los Angeles—Bar requirements remain at severely depressed levels, with the slump in buying attributed to the fact that jobbers and fabrica-



the tube that helps pay for itself

IT takes 20 operations—from broaching to final milling—to make this tubular spline shaft. Cost of this machining sequence makes the finished shaft a stiff rejection risk . . . only quality seamless tubing can be used for the job. The tubing used in this particular instance, however, helps pay for itself in the bargain.

This dividend stems from a spec change, a new analysis recently adopted by the manufacturer on Frasse recommendation. Costing 10% extra, this tubing, through better machinability, *more* than earns back its slight additional cost.

Elapsed time of the cut-off operation, for instance, has been reduced from 1.03 to .948 minutes. Rough turning once took 3.0 minutes—now requires but 1.72. Broaching is now accomplished in one pass instead of the previous two. And 6.77 minutes of hobbing operation have been cut to 5.72—*with 30% longer tool life*, by the manufacturer's own estimate.

Frasse is a leading distributor of steel tubing—and provides a wide range of immediately available carbon, alloy and stainless analyses to work from. But equally available, and equally useful, are Frasse engineering facilities to help you use tubing to your best advantage. Call *Peter A. FRASSE and Co., Inc., 17 Grand St., New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Ave., Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange St., Buffalo 3, N. Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester • Baltimore.*

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Burt engineers, with a background of more than half a century of specialized ventilating experience, will be glad to submit recommendations on request—without obligation.

* A recent survey reveals direct labor costs run 5% to 60% of manufacturing costs. Average for all companies reporting was 32%.

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tors are reducing their stocks to the level of current needs. One bar producer has shut down several open hearths, although an electric furnace remains in production.

San Francisco—Demand for steel bars is slack, supplies in jobber and consumer hands are plentiful and production is being curtailed.

Wire . . .

Wire Prices, Page 109

Pittsburgh—Softening in demand for wire products has forced some producers to curtail production schedules to a five-day basis. Producers are operating primarily on order backlogs with consequent further reduction in operations indicated. No improvement in orders for manufacturing wire items has developed, while jobbers' inventories of merchant products are at the best level for the postwar period. Consumers are closely watching inventory levels and for anticipated price reductions, with result new buying is limited to actual needs on basis of comparatively prompt deliveries now available from the mills. Sellers claim to be adhering to "mill-price" policy, although rumors persist some smaller steel producers are now equalizing freight.

Birmingham—Demand for wire products is well sustained in most instances. Baling wire demand has improved and woven fencing is finding a ready market, together with most items in nails. Supply and demand are in satisfactory balance.

Structural Shapes . . .

Structural Shape Prices, Page 109

New York—Structural activity is slightly improved and is featured by the placing of the second United Nations unit here, involving 11,500 tons. Still another unit, estimated to require around 10,000 to 11,000 tons, will be up for figuring later. Within the past week bids were closed on 6000 tons of miscellaneous state bridge work. Competition among fabricators is becoming increasingly keen, as backlogs shrink to an average of about 2½ months.

Philadelphia—Activity in structurals is spotty and is still dominated by public requirements. Competition among fabricators is increasingly sharp with plain material in freer supply. Some shape mills have accumulated fairly good inventories, and in all cases producers are at least caught up on arrearages.

Dallas—Building and construction totals for Texas running near $500 million for the first six months (ahead of the same period for 1948) has sustained good demand for all types of structurals. All materials are available to meet current and foreseeable needs and expectation is that better prospect of supplies will accelerate to some extent the overall building programs. Schedules for public works projects are expanding in Texas.

Seattle—Fabricators are maintaining normal operations and fair backlogs. Small jobs are numerous and the tonnage involved makes a sizable total.

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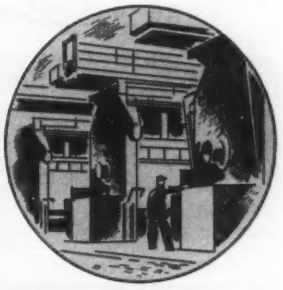

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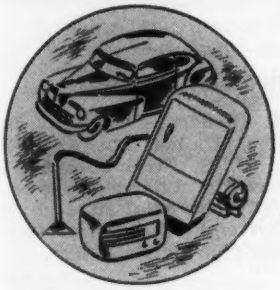

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"Labor's right to *organize and bargain*."

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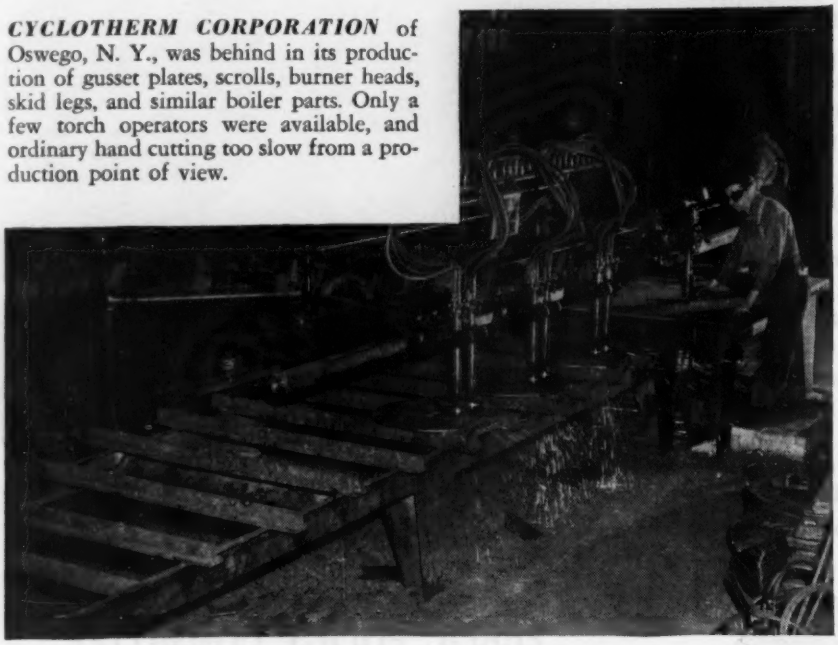
OCCUPATION_____

Machine gas cutting "ups" boiler parts production

CYCLOTHERM CORPORATION of Oswego, N. Y., was behind in its production of gusset plates, scrolls, burner heads, skid legs, and similar boiler parts. Only a few torch operators were available, and ordinary hand cutting too slow from a production point of view.



William Burkhardt and John View, Airco Representatives, were called in. They suggested machine gas cutting, using an Airco No. 6B Oxygraph, equipped with a six-torch set-up and a magnetic tracing device.

Production jumped immediately. Moreover, the new method proved much more economical, due to the elimination of jig set-ups, and reduced grinding time. Cyclotherm executives were also gratified by the increased accuracy of the machine method over hand cutting.

. . . .

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Tin Plate . . .

Tin Plate Prices, Page 109

Los Angeles—Demand for tin plate is holding up well, with spot shortages reported. Requirements for a number of canning packs, currently being run, are at their seasonal peak. Columbia Steel Co.'s tin mill at Pittsburg is producing at a rate limited only by the availability of hot-rolled coils. The coils are being supplied by Geneva Steel Co., with additional material as needed from Carnegie-Illinois Steel Corp. and Tennessee Coal, Iron & Railroad Co.

Tubular Goods . . .

Tubular Goods Prices, Page 109

Pittsburgh — Jobbers' stocks of standard pipe are largest and in better balance than at any time in postwar period. Demand continues relatively heavy, although not at pace recorded through most of last year. Consumers are more inventory conscious than was the case a year ago. Supply of mechanical tubing has been in good balance with demand for some months now; pressure tubing also has reached this position. Volume of alloy and stainless tubing orders has leveled off at substantially lower levels. With exception of large diameter seamless line pipe, a softening in projected requirements is noted for oil country tubular goods. A record number of wells has been driven to date this year, but a definite downtrend is indicated throughout second half.

New York—Fabricated pipe buying is featured by the placing of 4280 tons of 26-inch pipe by the Pan Handle-Eastern Pipe Co., with the A. O. Smith Corp., Milwaukee, for miscellaneous installations.

Dallas—Curtailment of oil drilling operations at about the same time that the steel industry began to catch up on pipe production has produced a more than adequate supply of tubular goods for the oil country. Some supply companies have suspended operations in their plants and curtailed production from 10 to 40 per cent in others. The construction industry, which is maintaining a rate that exceeds the pace for 1948, is sustaining a fairly brisk demand for all the types of pipe that it utilizes. Supplies are adequate, however.

Seattle—Practically no interest in cast iron pipe is evident. No projects of moment are up for figures. Materials are in good supply, but buyers are hesitant.

Export Price List Revised

New York—Reflecting reduction in price of zinc, United States Steel Export Co., U. S. Steel subsidiary, has announced the following new export prices, effective as of June 10, on carlots with freight included to New York, Philadelphia or Baltimore.

	Per Cent off List
American Standard Pipe, T. & C.:	
Butt Weld, 2½ and 3 in., galvanized	26.6
Seamless, 3½ to 6 in., galvanized..	19.1
English Gas Tubes, T. & C.:	
Butt Weld, 2½ and 3 in., galvanized	28.5

Prices are subject to seller's current list of extras and deductions and conditions of sale. All sales are subject to seller's prices in effect at time of shipment.

Pig Iron . . .

Pig iron melt in July expected to drop to lowest level in ten years

Pig Iron Prices, Page 110

New York—With demand dull and many foundries closing down for mass vacations ranging from a week to two weeks, foundry melt in this district is expected to reach the lowest level next month in at least ten years; no pronounced upturn is expected much before September. Meanwhile, pig iron producers are piling iron, with the likelihood that some will suspend operations within the next few weeks. The latest suspension in the East was at Swedeland, Pa., where, as reported last week, the smaller of two blast furnaces has been blown out.

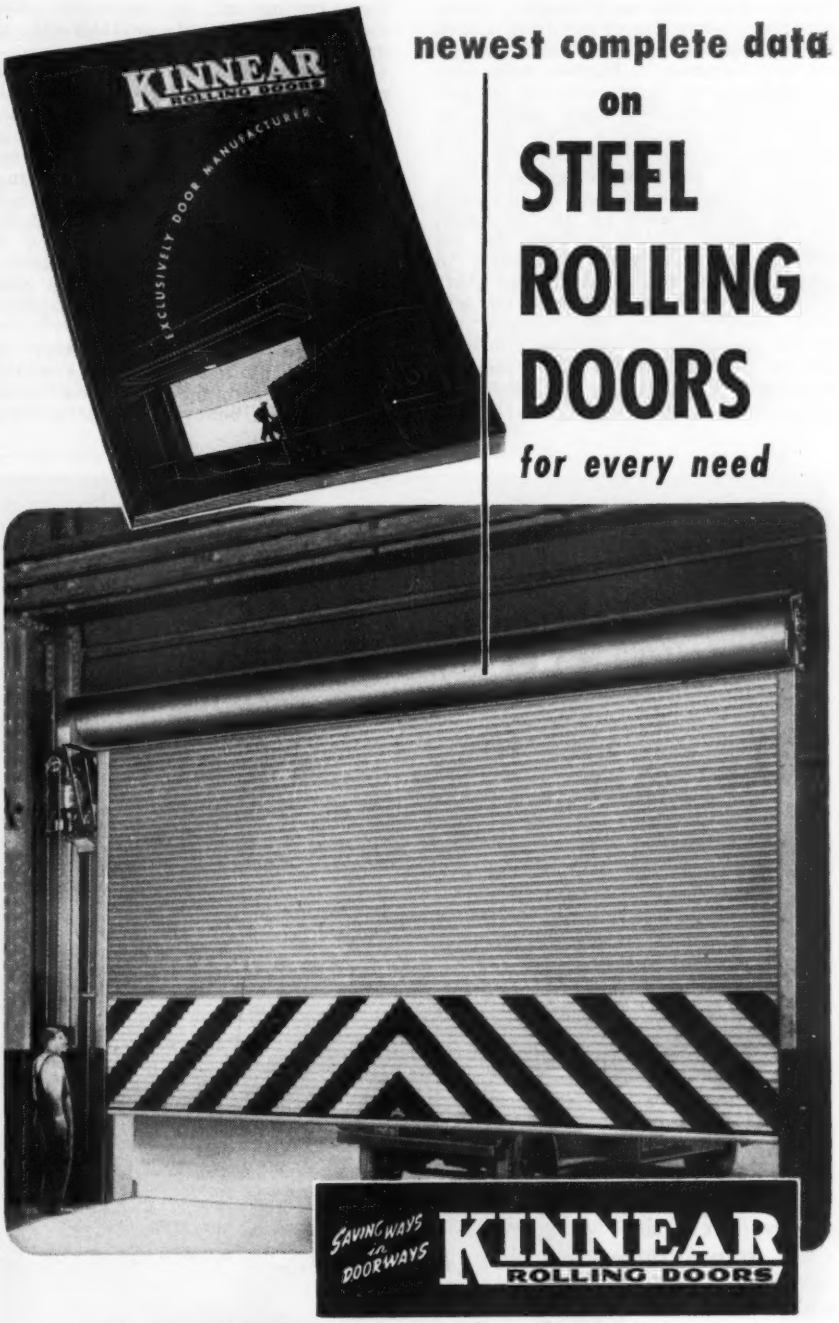
The Greek government has been inquiring for 10,000 tons, comprising basic, foundry and malleable iron for shipment to Genoa, Italy. One American seller was reported to have booked the tonnage, but he has denied this flatly. In view of the price that the buyer wanted to pay, it is unlikely the tonnage will be placed in this country. The price the Greek government is offering is said to be $48, delivered Genoa. As some sellers here estimate it would cost as much as $20 to deliver the iron, the net price for the seller would be far below the current market—too low to attract general interest at this time.

Ore mines of Republic Steel Corp. at Mineville and Lyon Mountain, N. Y., have laid off 50 men and have reduced the work week to four days, due to a decline in orders. The mines until recently employed 1620 workers.

Pittsburgh—Lack of orders has forced Jones & Laughlin to blow out its No. 6 blast furnace at the Pittsburgh Works, making 8 units taken out of service here for this reason; Carnegie having 3 units idle at Duquesne Works and 1 at Edgar-Thompson Works, Crucible Steel one at its Midland plant, and Pittsburgh Steel two furnaces at Monessen. In addition two furnaces are down for relining, making only 38 out of 47 units pouring iron. Barring coal and steel strike periods this represents the lowest postwar pig iron operating rate to date, with still further contraction in operations indicated over the summer months. Merchant interests are stocking pig iron in substantial volume, and there is a prospect these producers soon may blow out those units badly in need of repair.

Philadelphia—Pig iron sellers look for a further decline in shipments next month as many foundries are suspending operations for a week to two weeks for vacations, some for even longer periods because of lack of business. Two large pipe foundries are among those planning to suspend at the beginning of the month for mass vacations. At least two district steel plants also will close down their melting departments during the early part of July for vacations and others are expected to operate on a reduced scale.

Buffalo—Further recessions were posted in the pig iron trade last



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week, the Hanna Furnace plant shutting down one of its four active units. Republic Steel cut the heat on its two furnaces in Buffalo with output falling to 75 per cent of capacity. Both furnaces were placed on basic iron. Republic's Troy furnace continues at top production on merchant iron. In view of market conditions, the Tonawanda Iron plant is not rushing work on its idle stack. The furnace, which is down for relining, was originally scheduled to go back into action about the start of next month. It will now be several weeks before the furnace resumes operation. Foundries continue in the doldrums with many melters closing for vacations in July and August. Indications point to a further falling off in shipments and also an additional curtailment in iron output.

Cleveland—Demand for merchant pig iron is steady but light. With foundries taking summer vacations, there is no prospect of an upturn in requirements before fall. However, foundry inventories of iron are being reduced, although slowly inasmuch as operations average only about 30 per cent of capacity. One seller of merchant iron still finds it unnecessary to make iron at one of its producing points and is filling orders from stockpiles there.

Chicago—Despite the shutoff of shipments by many foundries which will be closed for vacations soon, some sellers believe that after this normally slack period demand will at least stabilize and perhaps pick up. A considerable portion of the trade believes reordering should come from some foundries soon because of their present low stocks. Widespread practice now is to order a carload at a time for prompt delivery and only when a definite castings order is in hand. Since two major car builders have told an iron producer that they will buy no more iron for the rest of the year, the problem of what to do with local furnaces now producing merchant iron in greater quantities than is being bought is becoming more pressing. Operator of at least one stack in the district is now faced with this problem and some time this week will make his decision on whether to shut it down or hope for a demand upturn.

Cincinnati—Extreme dullness has settled over the merchant iron market. Foundries on automotive work are busy, but others are on schedules of two or three days, or are shut down for vacations.

Birmingham—June shipments of pig iron are slightly in excess of those in May, indicating a gradually reviving market. One merchant iron representative said were it not for the foundry industry vacation period scheduled for early July, the picture would be even more promising by mid-month. A moderate pickup is anticipated as relatively large inventories are worked off.

St. Louis—Pig iron production here remains at 55 per cent of capacity, with about two-thirds of it basic. Coke production also has been trimmed. A few instances of foundries returning to the iron market are reported, principally larger ones who appear to have cleaned up the big inventories they started to trim two months ago. There is no sign, however, that the foundries' customers are coming in with new orders. Foundry stocks of pig in many cases have reached a minimum, forcing some foundries to demand shipment the day after the order is placed.

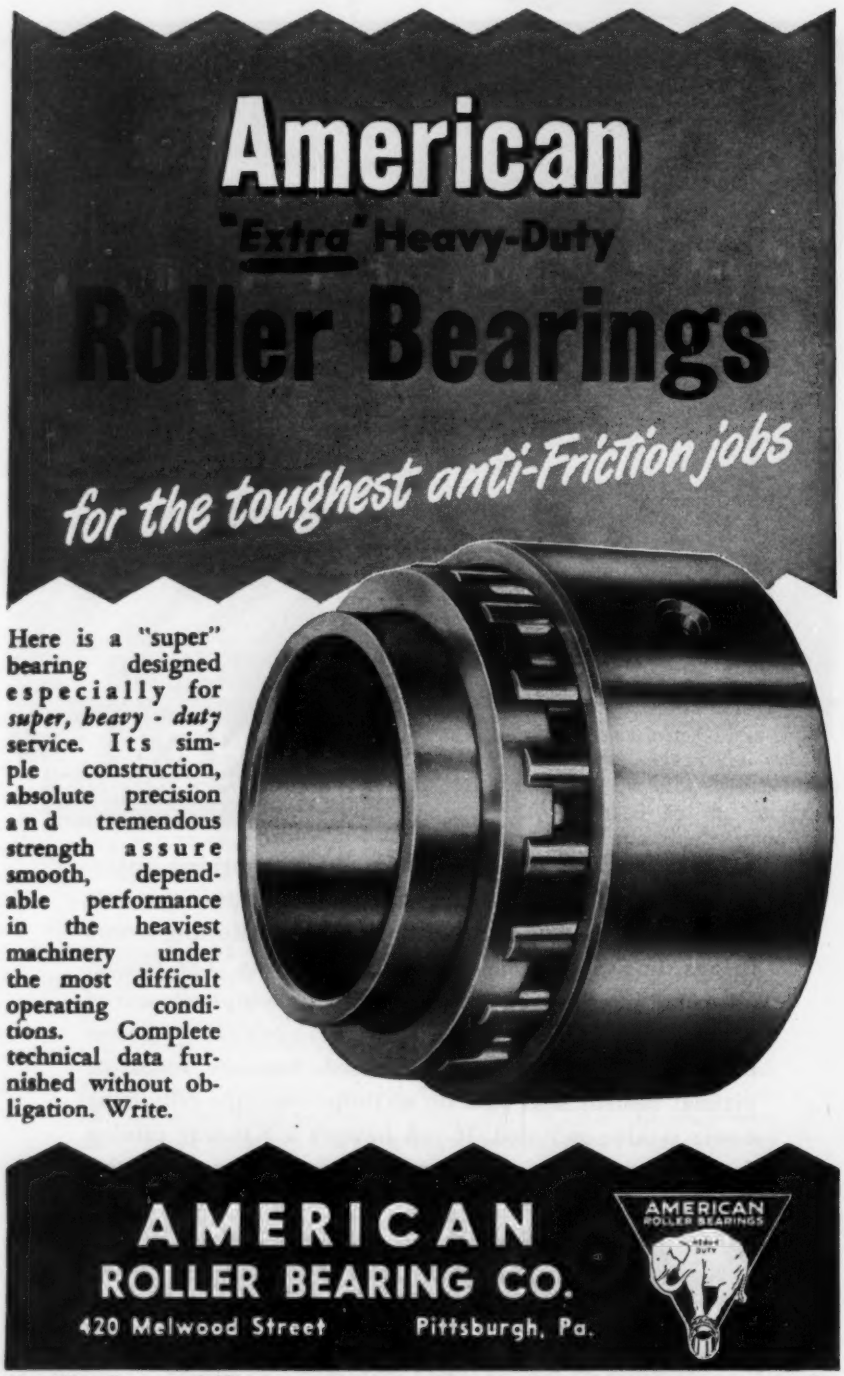
Pig Iron Output Declines

New York—Pig iron production of 5,448,062 tons in May represents a further decline, bringing production for the first five months up to 27,526,-843 tons. April production amounted to 5,479,510 tons. Ferromanganese and spiegel production was up slightly, amounting to 68,544 tons, against 51,220 tons in April. Total for year to date is 295,939 tons. Total production of iron and ferro amounted to 5,516,606 tons, against 5,530,730 tons the preceding month. Total for first five months was 27,822,733 tons or 92 per cent of capacity. Percentage of capacity for year to date is 95.3.

Alloy Steel . . .

Alloy Steel Prices, Page 109

Cleveland — Alloy and stainless steels, among the very first products to feel the decline in requirements, continue in weak demand with ordering of these grades far below the customary ratio with carbon steel. Consequently, considerable alloy production capacity in the northeastern Ohio area is idle.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Scrap . . .

Scrap Prices, Page 114

Restrictions eased on disposal of German scrap held by American firms

Washington—American companies that bought German scrap with the stipulation they would ship it to the United States have been released from this guaranty and now are free to ship it to any friendly country, according to a decision of the Interdepartmental Scrap Committee, Department of Commerce. This action takes a number of firms out of any embarrassing situation caused by the sharp drop in domestic scrap prices after they had contracted for large tonnages of German scrap on the basis of $28, f.a.s. north German ports.

Philadelphia—Further easing has developed in open hearth scrap prices, with No. 1 heavy melting steel now holding at $18, delivered, based principally on small sales to an eastern Pennsylvania mill. No. 2 heavy melting steel and No. 1 busheling are down 50 cents to $17 and No. 1 bundles $1 to $1.50, to $18. No. 2 bundles are unchanged at $15.50, delivered. Electric furnace bundles and heavy turnings have been marked down to $18. While cupola cast is unchanged at $25, delivered, machinery cast is off to $27-$28, charging box and heavy breakable cast to $23-$24 and clean auto cast to $27-$28. The movement next month in scrap, both steel and cast grades, is expected to be the lowest in years, barring strike periods. Sellers look for no important upturn before fall, at the earliest.

New York—Scrap brokers' prices are unchanged, with trading still exceptionally quiet. Dealers claim market has reached point where they cannot collect material and sell to brokers at a profit. A Pittsburgh mill has purchased a small tonnage of No. 2 heavy melting steel at around $11.50 New York.

Buffalo—Inertia continues to grip a weak scrap market. Dealers are buying No. 2 heavy melting and related items at $17 a ton and shipping against old orders placed at the outside figure of the prevailing range of $17.50-$18. However, coverage activity is of such light proportions that it hardly constitutes a market. Leading mill consumers are either on the sideline, or coming through with bids far under present quotations. Generally, buyers simply are not interested and collectors have trouble disposing of material.

An increase in the production of basic iron is also a bearish factor. On the other hand, the fact that pig iron producers are holding prices on merchant iron is cited in favor of the bullish side of the market. It is pointed out that the differential between prices on iron and scrap is considerably more than it normally is.

Cleveland—July is expected to be even poorer than the dull month of June for the scrap market, with a result there likely will be a further downward adjustment of prices. A principal revision is expected to be a drop in prices of blast furnace grades to re-establish the normal spread of around $4 between them and heavy melting steel. Some of the activity in June consisted of filling of old orders, but with the absence of new ordering this month there will be practically no old orders to be worked on in July. Decline in demand for iron and steel and uncertainties over the labor situation are contributing to the dullness in the scrap market.

Cincinnati—Scrap prices are nominal in a weak market with demand dropping to a postwar low. Mills are satisfied with present inventories and have curtailed shipments. Foundry business is in a slump which is aggravated by extensive vacation plans. Dealers normally shipping to this district face the dilemma of low prices and high freight rates, a combination threatening profitable operations.

Detroit — Closing of automotive scrap lists for July, which in the aggregate exceeded the heavy tonnage in June, was expected to depress prices further. Mills are not buying and brokers are wary of being caught with material they cannot move as was the case when previous lists were offered. Chrysler scrap tonnage was larger than a month ago, reflecting higher production schedules; Fisher Body was about the same.

Pittsburgh—With shipments on old orders largely completed, dealers are offering open-hearth grades at $1 to

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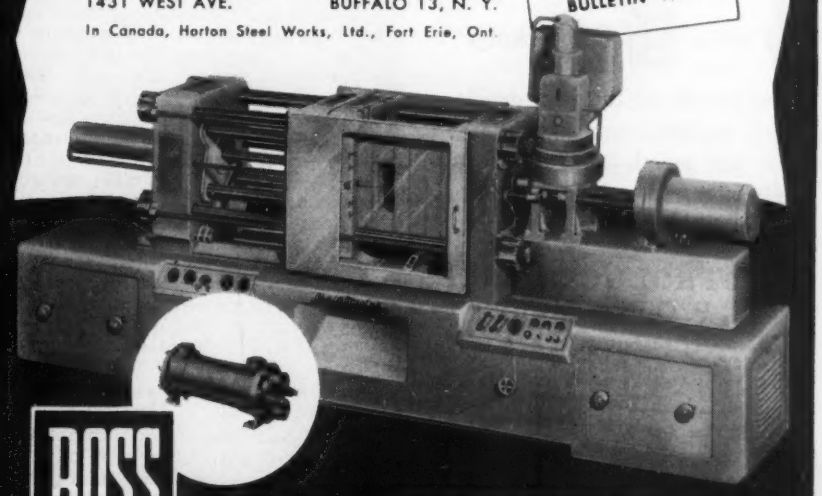

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\$2 below current quotations for July delivery. If normal pattern is followed, dealers and brokers will be given relatively small tonnage commitments for July toward the close of this month. While lower price levels are anticipated, extent of decline remains uncertain. There is also the possibility that mills may decide not to enter the market at this time because of exceptionally favorable inventory position and prospect of a further downtrend in steel output.

A steel producer here purchased 500 tons of No. 1 heavy melting at \$21 a ton, a drop of \$2, described as "distress material." This sale was not large enough to "establish" a market but possibly indicated the nearby trend.

Chicago—Decision last week by a major mill to reduce its price on allocated No. 1 railroad scrap \$2 a ton prompted a general lowering in steelmaking grades by that amount. At press time, no new mill buying was reported to confirm the new price structure. Many in the trade expect mill buying for next month to be extremely limited, and belief is widely held that the market leaders may not buy any dealer material. With the latest price reductions, based on appraisal rather than transaction, danger of a rebound is highlighted. Virtually everyone in the trade now knows that remote scrap can be moved in only limited quantities at the present price and traders point out that metalworking activity, and consequently scrap generation, will slow down considerably in the next two vacation-season months. Cast scrap is particularly vulnerable to an increase in demand at this time. A few orders recently placed for these grades have brokers wary that an influx of new orders may be in the making. Quotations remain unchanged.

Birmingham—Marked inactivity continues in the scrap market. Wet weather and low prices have resulted in practically no scrap moving in the past two weeks. Heavy melting continues nominally at \$18.

St. Louis—Scrap prices held steady last week for the first time in several months. Transactions were small, but some dealers professed to see a halt in the long decline, or even a reversal, since one mill bought a quantity of No. 2 melting steel at \$20, around \$2 above the last substantial deal here. In recent months, however, a number of token orders have been placed by mills simply to keep alive their faithful wartime sources of supply. However, another mill here plans to cancel the undelivered portion of a No. 2 order at \$18. The buyer expects to get it under that figure later. Most purchasing agents are getting fair shipments against \$18 orders. Because of low scrap prices and 60-day inventories, at least one steel mill charges 80 per cent scrap in the mix.

Los Angeles—Scrap market continues dull with little sign of change for the near term. Continuing reduction in mill operations, combined with their substantial stockpiles and the steady inflow of foreign scrap at all Pacific Coast ports, leaves scanty need at present for domestic material. Reported going out of business are many small dealers, particularly in Arizona and New Mexico, who at

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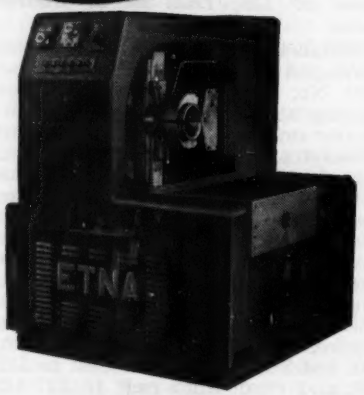

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current price levels cannot absorb the freight on scrap they have been shipping to Pueblo, Col., and Southern California. Prices remain unchanged but the undertone is soft.

San Francisco—Scrap prices are steady, but movement of domestic material is slow. Slackening mill operations plus large mill stockpiles, moreover, indicate no pick-up in the immediate future. Some sources speculate on a lowering of current prices within the next month or two.

Seattle—Local mills have an extended field for obtaining scrap, Canada having renewed export licenses for the first time since before the war. Local mills are paying $17, delivered, for No. 1 and No. 2 heavy melting. Some excellent grade shipments have arrived by rail from Vancouver, B. C. Mills are getting as much material as is necessary to insure continued heavy plant operations, although no effort is being made to increase inventories unduly.

Foundries report No. 1 cupola size cast iron scrap is $23 maximum, although a majority of the plants are out of the market. Electric furnace scrap, No. 1, is on a basis of $25, although one local firm reports a purchase at $27.50 for superior grade. Foundry operations are slowing.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 110

Chicago—Action taken by a major oven foundry coke seller here in reducing his price 40 cents a ton to an oven price of $20 in Chicago and $20.75 in Milwaukee has brought forth little reaction within the trade. Other nearby producers, some of whom do not attempt to move their product into the Chicago switching district, are apparently not anticipating reductions to meet this new price. This new price, incidentally, only brings that seller's price into line with the quotation of a local utility and producer of metallurgical grades of coke.

Iron Ore Consumption Dips

Cleveland—Consumption of Lake Superior iron ore declined in May to 7,276,719 tons from 7,321,856 tons in April, according to the Lake Superior Iron Ore Association, this city. Consumption was larger than a year ago when it amounted to 6,656,498 tons. Total for the first five months amounted to 36,916,231 tons in 1949 against 31,764,063 in 1948. On the basis of the decline in number of furnaces in blast consumption during the current month will drop sharply. As of June 1, 21 blast furnaces depending principally on Lake Superior ore were idle in this country against 10 as of May 1 and 13 as of June 1, 1948; the number in blast during the respective months was 164, 175 and 169.

Total stocks of iron ore on hand amounted to 21,508,087 tons as of June 1 against 17,802,854 on May 1. Bulk of the increase was in stocks at furnaces in the United States, amounting to 18,265,408 tons as of June 1 against 14,863,668 tons as of

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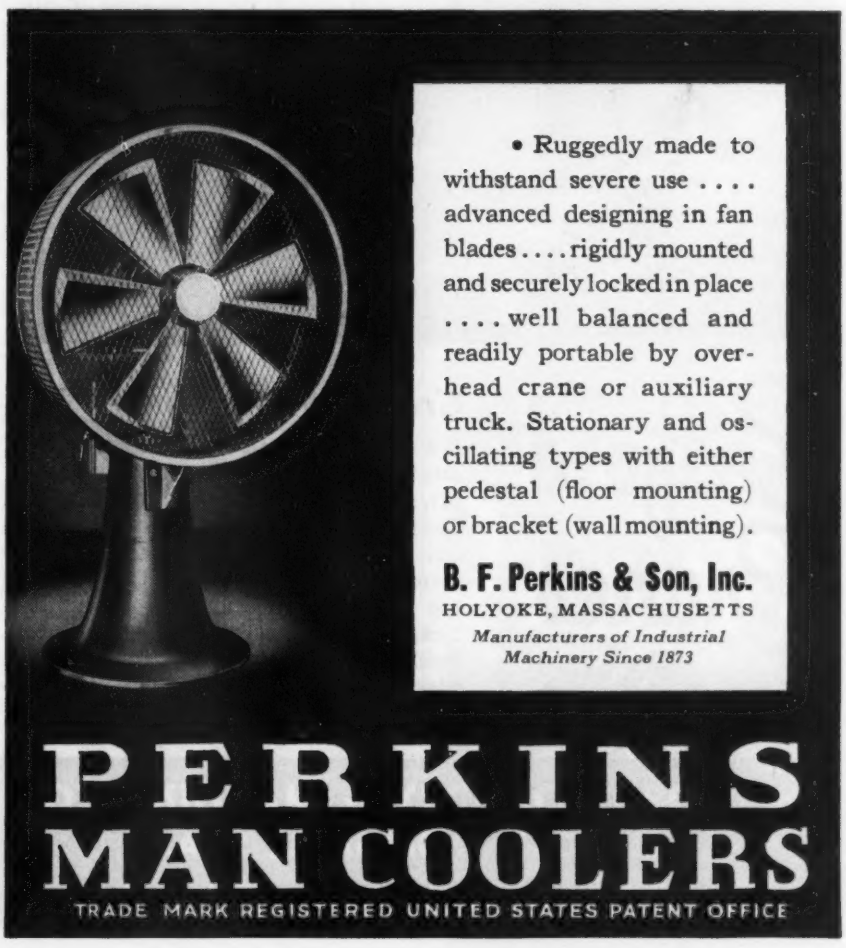
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May 1. Stocks a year ago amounted to 22,058,158 tons.

Shipments of ore from upper lake ports so far this year are about 2 million tons larger than those for the like period a year ago. Total for the season to June 20 is 28,727,032 tons compared with 26,776,447 for the like 1948 period. During the week ended June 20, shipments from United States ports totaled 2,766,005 tons compared with 2,850,426 tons for the preceding week and 2,798,937 for the like week a year ago.

Warehouse . . .

Warehouse Prices, Page 111

Pittsburgh—Independent steel distributors are equalizing freight to meet increasing competition from other warehouse centers on shipments to destinations such as Erie, Pa., which could be serviced from other cities. With exception of tubular products, galvanized sheets, wide flange beams and a few small hot-rolled carbon bar sizes, demand for steel from warehouse stocks is off as much as 40 per cent from record requirements reported a year ago. Distributors' inventories are largest and in better balance than at any time in postwar period. Reflecting lower mill galvanized sheet coating extras, averaging a decline of about $1.50 per ton, some steel distributors have reduced galvanized sheet 10 gage base price to $6.85 per 100 pounds, off $1 a ton. Other interests were expected to follow before end of month.

Philadelphia—Jobbers have reduced hot alloy steel prices about 5 per cent, with alloy 4140, as rolled, now holding at 8.00c, city, and 7.85c, country. Reflecting continued weakening in zinc, No. 10 gage galvanized sheets out of local warehouse are down 5 cents per 100 pounds to 6.73c a pound, city, and 6.58c, country. In addition to a decline this month, distributors look for a further falling off in business in July, as many consuming plants will be down for about two weeks on an average for vacations and in some cases longer because of lack of orders.

Cincinnati — Sales of steel from warehouse continue to sag, the plans for vacations in many fabricating shops being an important contributing factor. Business from coal mining operations is also off sharply. Individual orders are much smaller than the average earlier in the year. Jobbers have had a few offers of steel from consumers who found inventories overstocked.

Chicago—Tapering in warehouse volume continues as buyers in diversified industries adjust to lower production schedules. Some items of carbon steel are still in tight supply, although for the most part stocks of all grades have improved and in some specialties tend to be burdensome. Reduction in cold-finished bar prices has had the general effect of bringing back to the warehouse market those buyers who had found mills willing to accept orders in the smaller tonnage lots normally distributed by warehouses. No. 10 galvanized sheet price, now predicated on 9-cent zinc, is quoted, by some local distributors

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at $6.80 per 100 pounds, down $1 a ton.

Birmingham—Warehouse stocks are improving gradually as demand continues slightly on the upgrade for most specifications. Steel mills are not moving desired tonnages into warehouses, however, because they are heavily booked into the next quarter.

Los Angeles — Steel jobbers are buying only enough to maintain minimum inventory needs, reportedly in the hope of across-the-board mill price reductions. Best informed observers, however, do not believe such reductions are in near prospect. Meanwhile, warehouse activity is holding at a fairly stable level, with some increase noted in the requirements of small manufacturers handling seasonal lines.

San Francisco—Jobbers are not placing many new orders. Some firms are stocking little steel, others are still working off heavy inventories which piled up early this year when deliveries from mills were being made at a time that business was slumping an average of 35 per cent.

Seattle—Jobbing houses have more goods in transit and expect to have complete inventories within 60 days. Volume is fairly steady, somewhat under a year ago, but substantially more than prewar. Galvanized sheets are still scarce, but curbstone sources have been making carload offers of this material. Plates are in improved supply, Kaiser meeting Geneva's prices and offering August delivery; the same applies to shapes. Alloys are quiet on account of reduced logging operations and inactivity at small machine shops. Supplies are ample. The price structure is unchanged.

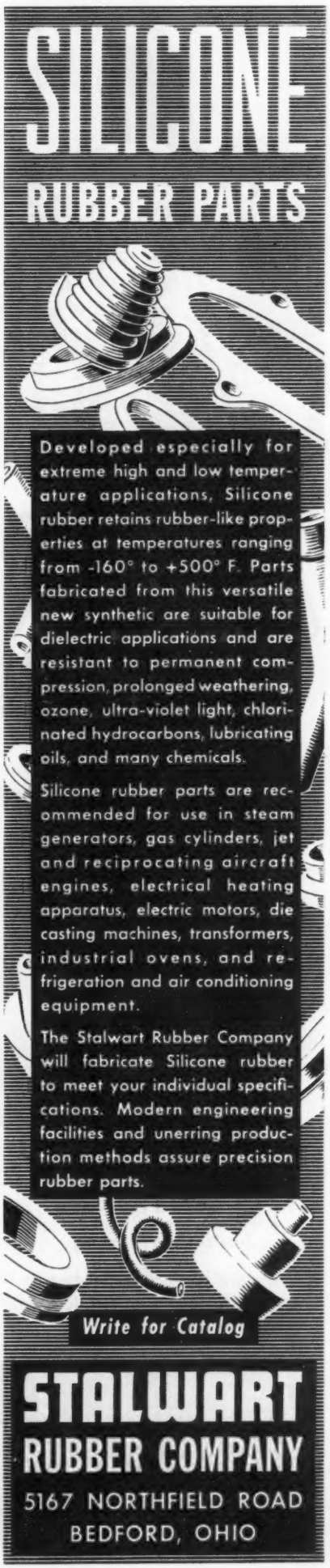
Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 109

New York—Bolt and nut prices at makers' plants generally continue steady. Most makers doubt there will be any broad change at this time, unless there is a drop in the mill prices on bars and rods. Backlogs at bolt and nut plants are shrinking and incoming business is not sufficient to maintain recent rate of operations. This is a weakening factor, but not too much so in the light of plans for further curtailing production with the vacation season at hand.

Weakness here in bolt and nut prices is limited largely to jobber prices, a situation that also extends to such light fasteners as wood and machine screw products. In these latter light products, manufacturers as well as distributors are reducing their quotations.

Pittsburgh—Fastener industry continues to follow policy of price in effect at time of shipment, while freight equalization in respect to meeting competition generally prevails. No change in price levels is reported here. Operations have been curtailed to an average of four days per week to more closely coincide with rate of incoming orders. Standard items are readily available from stock, while order backlogs of odd sizes have been substantially reduced since first of year.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Chromite Supplies Increase

Washington—Imports of chromite into the United States during the fourth quarter of 1948 dropped to 366,556 net tons from 399,094 tons in the third quarter, but the year's total of 1,542,076 tons established a new record high and was nearly twice the consumption of 875,033 tons, according to the Bureau of Mines. Total supply of chromite during 1948 totaled 1,545,527 net tons, including 3451 tons of domestic production. Of the total tonnage, used, 114,392 tons, or 48 per cent, were used for metallurgical purposes, mainly in the manufacture of ferrochromium; 69,108 tons, or 29 per cent, were used in the manufacture of 87,510 tons of chromium refractories; and 11,985 tons, or 5 per cent, were used for miscellaneous purposes, mainly in repairing basic-furnace linings.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

11,500 tons, meeting hall, United Nations development, New York, to American Bridge Co., Pittsburgh; this is in addition to 14,000 tons for the Secretariat building noted as placed some months ago with this fabricator; another unit, involving possibly 10,000 to 11,000 tons, is scheduled to come out later.

1770 tons, state hospital, Binghamton, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

800 tons, state bridge, Bronx, New York, through Johnson, Drake & Piper Inc., contractors, that city, to Harris Structural Steel Co., New York.

580 tons, steel curbing, New York, to Vulcan Steel Products Co.

580 tons, Vanderbilt Clinic, Columbia University, New York, to Grand Iron Works, that city.

315 tons, service station, Delaware Power & Light Co., Wilmington, Del., to Bethlehem Fabricators Inc.

300 tons, Shulamith School for Girls, Brooklyn, N. Y., to Grand Iron Works, New York.

300 tons, Columbia Basin project, to unstated interest; Morrison-Knudsen Co., Seattle, general contractor.

230 tons, Theological building, Wappingers Falls, N. Y., to the Levine Iron Works.

220 tons, finishing building, International Paper Co., North Tonawanda, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

200 tons, Lehigh Valley grade crossing, Cranford, N. J., to the Phoenix Bridge Co., Phoenixville, Pa.

160 tons, construction project, Ampere, Wash., to International Derrick Co., Torrance, Cal., low $40,217, to Bonneville Power Administration.

110 tons, youth center, Pottstown, Pa., to Mayer Polock, that city.

STRUCTURAL STEEL PENDING

6000 tons, miscellaneous steel bridge work, New York, bids open June 22; this work includes 4100 tons for a viaduct and 700 tons for a bridge, both on the Bronx River Parkway, as noted in a recent issue.

5000 tons, Senate office building, Washington; deferred.

1590 tons, state turnpike section, Montgomery county, Pa.; bids July 22.

1500 tons, transmission towers; Bethlehem Pacific Coast Steel Corp., Seattle, low to Bonneville Power Administration.

1300 tons, school No. 240, New York, Caristo Construction Co., low on general contract.

600 tons, Unionport municipal Bascule bridge, New York, Moore & Lopier, low on the general contract.

300 tons, breakwater at Nome, Alaska; bids to U. S. Engineer, Seattle, June 30.

285 tons, Okanogan river bridge, Washington; bids to U. S. Engineer, Seattle, June 24.

280 tons, state turnpike section, Chester county, Pa.; bids July 22.

200 tons, Admiral way bridge, Seattle; Isaacson Iron Works, Seattle, low; T. N. Buchanan Co. Inc., Seattle, low general contract, $110,513.

150 tons, Consolidated Freightways warehouse, Seattle; bids in.

100 tons, including reinforcing bars, Public Roads Administration bridge, Snohomish county, Washington; bids to Portland, June 29.

100 tons, also reinforcing and oil tanks, Fort Peck, Montana; Williston substation; bids to Bureau of Reclamation, Fort Peck, July 12.

100 tons, crane runway, Midvale Co., Nicetown, Philadelphia; pending.

Unstated, miscellaneous items including rails and accessories, Hungry Horse power plant, Montana; bids to Bureau of Reclamation, Denver, July 7; spec. No. 2710.

Unstated tonnage, 21-story office building, Massachusetts Life Insurance Co., 5th Ave. and 48th St., New York; plans in the preliminary stage.

REINFORCING BARS . . .

REINFORCING BARS PLACED

154 tons, Pine Canyon state bridge, Washington, to Bethlehem Pacific Coast Steel Corp., Seattle; State Construction Co., general contract.

135 tons, state highway project, near Grand Coulee, to Bethlehem Pacific Coast Steel Corp., Seattle; Peter Kiewit & Sons, general contract.

REINFORCING BARS PENDING

100 tons, Washington state highway projects; bids to Olympia, July 8.

100 tons, railroad and highway relocation, Meridian dam, Oregon; Utah Construction Co., San Francisco, low $1,178,057 to U. S. Engineer, Portland, for general contract.

Unstated, warehouse for Spool Cotton Co., Portland, Oreg.; general contract to Lathrop, Gilliam & Percy, Portland.

PLATES . . .

PLATES PENDING

1500 tons or more, 124,600 sq ft sheet steel piling, also 300 tons shapes, proposed breakwater at Nome, Alaska; bids to U. S. Engineer, Seattle, June 30.

100 tons, Corps of Engineers, Omaha, Nebr.; inv. 273; bids in.

Unstated, 15,500 feet 20 inch steel water pipe; also tanks and accessories; bids to Donald R. Wilson, city manager, Anchorage, Alaska, June 24.

Unstated, oil storage tanks for Gorge powerhouse; bids to Seattle, June 23.

PIPE . . .

CAST IRON PIPE PLACED

4280 tons, 26-inch pipe, Pan Handle-Eastern Pipe Co., for miscellaneous installation, to the A. O. Smith Corp., Milwaukee.

800 tons, municipal water main, East 68th and West 65th streets, New York, to American Locomotive Co., that city.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chicago & Eastern Illinois, ten 1500-horsepower diesel road locomotives and four 1000-horsepower switchers, to Electro-Motive Division, General Motors Corp., La Grange, Ill., for delivery in 1950.

Southern Pacific Railroad, 67 diesel locomotives, 28 freight units of 6000-hp to Electro-Motive Division, General Motors Corp., La Grange, Ill.; 22 switchers of 1000-hp to American Locomotive Co., New York; and 17 switchers of 1500-hp to Baldwin Locomotive Works, Eddystone, Pa.

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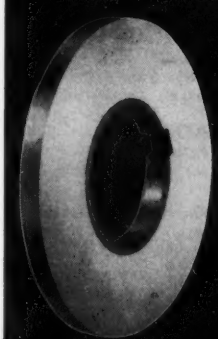

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CONSTRUCTION AND ENTERPRISE

ALABAMA

GORGAS, ALA.—Commonwealth & Southern Corp., c/o contractor, has awarded a $300,000 contract for Alabama Power Co. to Hardaway Contracting Co., 15 11th St., Columbus, Ga., for construction of a steam electric plant.

CALIFORNIA

SOUTH GATE, CALIF. — South Gate Iron Works is erecting a plant at 2311 E. 96th St. for fabrication of ornamental iron and light structural steel.

DISTRICT OF COLUMBIA

WASHINGTON, D. C.—Westinghouse Elevator Division of Westinghouse Electric Corp., Pittsburgh, has been awarded a $1,384,999 contract for installation of 12 passenger elevators, 4 freight elevators, and 16 electric stairways for projected General Accounting Office Bldg.

ILLINOIS

CHICAGO—Fairbanks, Morse & Co., 600 S. Michigan St., has awarded a $350,000 contract to Fallon, O'Donovan & Rassas, 4619 W. School St., for construction of a factory and warehouse; A. Epstein & Sons Co., 2011 W. Pershing Rd., architect.

SUMMIT, ILL.—Corn Products Refining Co., 333 Michigan St., has awarded an $8 million contract to Bedford Construction Co., 333 N. Michigan St., for construction of a boiler plant; Sargent & Lundy, 140 S. Dearborn St., Chicago, engineer.

KANSAS

ASHLAND, KANS.—Ashland Co-operative Exchange has awarded a $116,000 contract to Chalmers & Borton Co., Hoke Bldg., Hutchinson, Kans., for construction of a grain elevator.

KENTUCKY

LOUISVILLE—Louisville Brick & Tile Co., c/o A. J. Klee, 1328 S. 12th St., will soon let a $100,000 contract for a plant.

LOUISIANA

MONROE, LA.—City approved a $7 million bond issue for improvement of municipal utilities.

NEW ORLEANS—Louisiana Power & Light Co. plans a $9 million steam-electric generating plant nine miles from New Orleans on the Mississippi river.

NEBRASKA

RAVENNA, NEBR.—Chicago, Burlington & Quincy Railroad, H. R. Clarke, chief engineer, 547 W. Jackson Blvd., Chicago, will build a centralized traffic control system from Ravenna to Alliance, Nebr.; approximate cost $1 million.

NEW JERSEY

DENVILLE, N. J.—Alexander Summer Inc., 790 Queen Anne Rd., Teaneck, N. J., has awarded a $400,000 contract to Joseph Muscarelle, 42 First St., Hackensack, N. J., for construction of a factory; General Box Co., 500 N. Dearborn St., Chicago, lessee.

OHIO

CLEVELAND—Fifteen Cleveland concerns are supplying parts for the newest turbojet engine, the J-47, which is assembled and fabricated at the new plant of General Electric Co. at Lockland, O., near Cincinnati. Major contributions to the J-47 are being made by Thompson Products Inc., 23555 Euclid Ave.; Weatherhead Co., 300 E. 131st St.; Rausch Nut & Mfg. Co., 869 E. 140th St.; Mutual Metal Products Co., 17600 Waterloo Rd.; Eaton Mfg. Co., 739 E. 140th St.; and Pesco Products Co., 11610 Euclid Ave.

HURON, O.—Wheeling & Lake Erie Railroad dock is the site of a proposed $2 million project in which electric loaders would be installed to replace the two steam unloaders now in use.

TOLEDO, O.—Sun Oil Co., Woodville & city limits, has awarded a $200,000 contract to George Lathrop & Sons Inc., 1510 Montcalm St., for construction of a plant administration building and gatehouse; Peterson, Hoffman & Barber, Spitzer Bldg., architect.

OKLAHOMA

MUSKOGEE, OKLA.—Oklahoma Natural Gas Co., P. V. Root, manager, has plans for a $100,000 office building; Haralson & Horstman, architect.

OREGON

PORTLAND, OREG.—Northwest Marine Iron Works announces award of three machinery contracts, totaling $360,000 from government agencies, involving hoists, tainter gates, valves and other equipment.

PORTLAND, OREG.—Plans for proposed $200,000 warehouse are announced by Dan Davis, Davis Bag Co., to be occupied by Spool Cotton Co. at NE 13th & Lombard Place; general contract is held by Lathrop, Gillam & Percy.

PENNSYLVANIA

UPPER DARBY, PA.—Philadelphia & Western Railroad, Maine & Swede Sts., Norristown, Pa., will build a $500,000 garage; plans by Simon & Boulware, Fidelity-Philadelphia Trust Bldg., Philadelphia.

TEXAS

BAYTOWN, TEX.—Humble Oil & Refining Co. plans complete harbor improvements; estimated cost, $4 million.

BELTON, TEX.—Brazos River Transmission Electric Co-operative, Waco, Tex., will erect two steam generating units in Oak Charter plant; cost $6,480,000.

DALLAS—Dallas Power & Light Co. plans a $32 million expansion and improvement program.

DALLAS—Beard & Stone Electric Co. Inc., 2101 Bryan St., will build a $100,000 electric shop, Live Oak St.

DALLAS—Dallas Power & Light Co., Dallas Power & Light Bldg., will erect a $3 million turbine-generator electric power unit, to be known as Parksdale power plant.

DALLAS—Eastman Kodak Co., Rochester, N. Y., has awarded a $1,259,382 contract to Henry C. Beck Co., Atlanta, and Dallas, for offices and warehouse; Thomas, Jameson & Merrill, 501 Trinity Universal Bldg., architect.

HOUSTON—Humble Oil & Refining Co., Humble Bldg., will spend $100,000 in reconstructing warehouse, Race & Rains Sts.

HOUSTON—Joe Shiver & Associate, Angleton, Tex., will build a $1 million storage building, 2900 block Navigation Blvd.; plans by Edward Palmer Potter, 1811 Southgate St.

HOUSTON—Houston Lighting & Power Co., 1016 Walker St., will spend $1 million in a West Junction Station plant expansion, and $1 million for a turbine generator unit and appurtenances.

HOUSTON—Katy Park Industrial Development Corp., J. B. Salmon, president, c/o First National Bank Bldg., has awarded an $18 million contract to O'Rourke Construction Co., 4011 Koehler St., for construction of a warehouse.

LONGVIEW, TEX.—Southwestern Gas & Electric Co., 428 Travis St., Shreveport, La., has awarded a $4,750,000 contract to Austin Bldg. Co., for construction of a power plant; A. B. McIver, c/o owner, engineer.

STINNETT, TEX.—Stacey-Dresser Engineering Division (Dresser Industries), 1900 Superior St., Cleveland, will build a $375,000 plant.

VIRGINIA

NORFOLK, VA.—J. H. Miles & Co. Inc., Southampton Ave., has awarded a $500,000 contract to E. T. Gresham Co. Inc., 1038 W. 26th St., for construction of an oyster packing plant, including equipment.

WASHINGTON

SEATTLE—Westinghouse Electric Corp. has submitted low bid to Seattle light department, $4,445,222, for furnishing three 90,000 kw generators for Ross dam plant, Skagit river project.

SEATTLE—Directors of Marshall Field & Co., Chicago, have approved a proposed $6,250,000 addition to Frederick & Nelson's store; plans by John Graham, architect, and bids are scheduled in four months.

SEATTLE—Bureau of Reclamation has called bids at Denver, Colo., June 21 for hydraulic hoist elevator equipment and transfer car for Canyon Ferry dam; at Coulee dam June 28, for a two-million gallon welded water storage tank; June 21, for steel structures for Burbank pumping plant No. 1. Awards placed include 16¾ mi. extension of the East low canal, Columbia Basin project and construction of wasteway to J. A. Terteling & Sons, Boise, Idaho, $8,029,762; to J. N. Konen, Lewiston, Idaho, for filter house, disposal unit, etc., Lewiston Orchards project, $176,362. The Bureau expects to call bids about June 17 for three 40,000 pound capacity radial gate hoists for feeder canal; June 15, for air compressor and receivers Coule pumping plant; June 24, air conditioning equipment, June 17, for power plant equipment; in July-August, for steel circuit towers and take-off structures, Coulee power plant; four penstock wheel gates, hoist control and steel for take-off structure. Hungry Horse project, Montana.

SELAH, WASH.—Lidral Construction Co., Seattle, has been awarded a $125,437 general contract for installation of treatment plant.

SPOKANE, WASH.—Columbia Gypsum Products Inc., H. A. Andrews, general manager, will construct a $200,000 plant addition to house grinding and plastic operations.

WALLA WALLA, WASH.—Col. William Whipple, U. S. district engineer, has called bids July 19 for the second major step in construction of McNary dam on the Columbia river. This project involves coffer dams, concrete work, excavation, electrical work and other items.

WALLA WALLA, WASH.—U. S. engineer received bids June 6 for the second major unit McNary dam, involving the Oregon shore cofferdam and portion of the powerhouse. Bids will be opened June 23 for tainter valves, hydraulic equipment, etc., for McNary, and July 6 for stop log derricks for navigation locks; Pelton Water Wheel Co., San Francisco, has been awarded contract to fabricate two 4500-hp hydraulic turbines and governing equipment.

WISCONSIN

GRANVILLE, WIS. (P. O. Milwaukee) — American Can Co., 230 Park Ave., New York, has awarded a $2 million contract to Turner Construction Co., 105 W. Adams St., Chicago, for construction of a plant.

LACROSSE, WIS.—G. Helleman Brewing Co., 1027 S. Third St., has awarded a $1.4 million contract to L. G. Arnold Inc., 201 N. Dewey St., Eau Claire, Wis., for construction of storage cellars; Harley, Ellington & Day Inc., 153 E. Elizabeth St., Detroit, engineer and architect.

MILWAUKEE—Allis-Chalmers Mfg. Co. has been awarded a $485,050 contract by the Bureau of Yards & Docks, Navy Department, for wind tunnel drive equipment. David Taylor model basin, Carderock, Md.

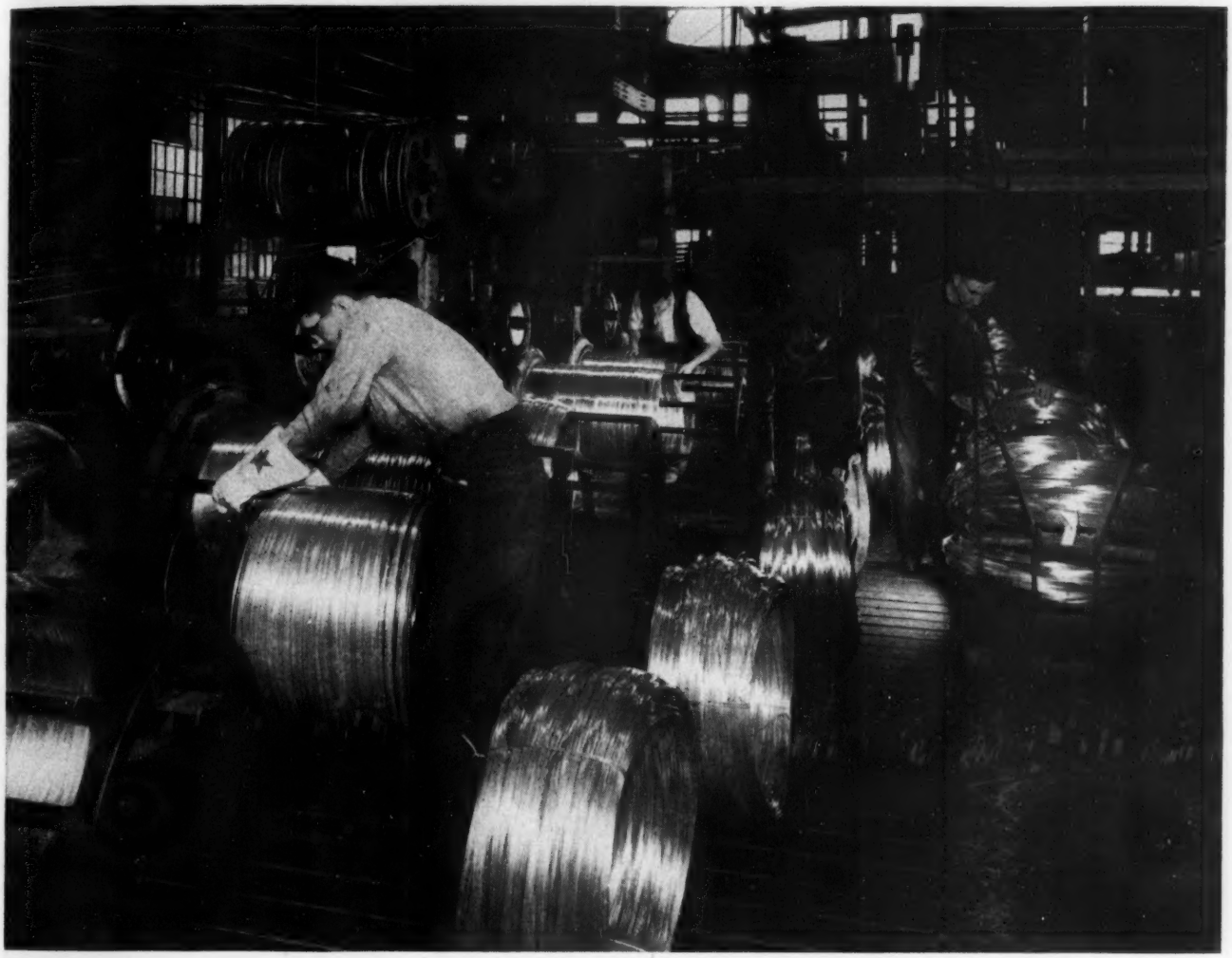
CANADA

TRAIL, B. C.—Consolidated Mining & Smelting Co. Ltd. will erect a $12 million lead smelter.

SHERRIDON, MAN.—Sherritt Gordon Mines Ltd., 5 King St., Toronto, Ont., will erect a $17.5 million power plant.

LEAMINGTON, ONT. — Co-operative of Ontario, 28 Duke St., and Department of Agriculture, Queens Park, Toronto, Ont., will build a storage and shipping plant, $500,000.

MIMICO, ONT.—Co-operative of Ontario, 28 Duke St., and Department of Agriculture Queens Park, Toronto, Ont., will build a $500,000 storage and shipping plant, near Lake Shore road.



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LONG delays were only one of the drawbacks of the former method of using magnesite and slag to fill deep holes in open hearth banks and flats. You old timers will recall, for instance, how tough it was to keep the hole clean while you burned in the patch, layer after layer.

Like most operators today, you probably repair deep holes with Ramset. You clean the hole and cut off the fuel to minimize drainage. Then, as fast as it can be shoveled, you fill the hole with Ramset, tempered to the consistency of concrete and wet enough to flow into irregular cavities. There are no voids in the repair, which has a strong chemical bond at all depths. Slag free and dense, the job is completed in a quarter of the time required by the old practice.

On the deep hole repair he is supervising, John Hysong is raising the Ramset to proper level. Then he will have the furnace brought to temperature and held until the repair shows color. The few inches of Magnefer used to dress and overlap the patch will be burned for another 15 to 20 minutes before charging the furnace.

When a hole to be repaired is shallow rather than deep, your Basic Engineer recommends the use of Basifrit. The quick setting properties of Basifrit eliminate any need to dilute the periclase (crystalline magnesia) content with slag and because Basifrit burns in so rapidly there is little likelihood of contaminating the repair with slag drainage.

John Hysong, with his many years of practical steel making experience, recognizes that a major hot repair is primarily a steel production problem. Like other Basic Engineers he approaches all your refractory problems from the angle of extending furnace life, reducing delay time and lowering refractory cost per ton of steel.

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Allis-Chalmers Offers Prompt Aid in Raising Steel-Making Efficiency, Lowering Production Costs

RECENT INDUSTRY IMPROVEMENTS will make many existing steel mills inefficient and *unprofitable* to operate in the years ahead. Greater speed and capacity with finer control are reducing waste and outage time. Changing consumer demand also will dictate mill revamping.

MAKE 3 MILLS DO JOB OF 5

In a typical sheet temper mill revamping program, A-C engineering and equipment is enabling *three* single stand rolling mills to produce as much as the *five* single stand mills did originally! Strip speeds and reel capacities are being *doubled* and the two mills and associated equipment no longer needed are being applied to other operations.

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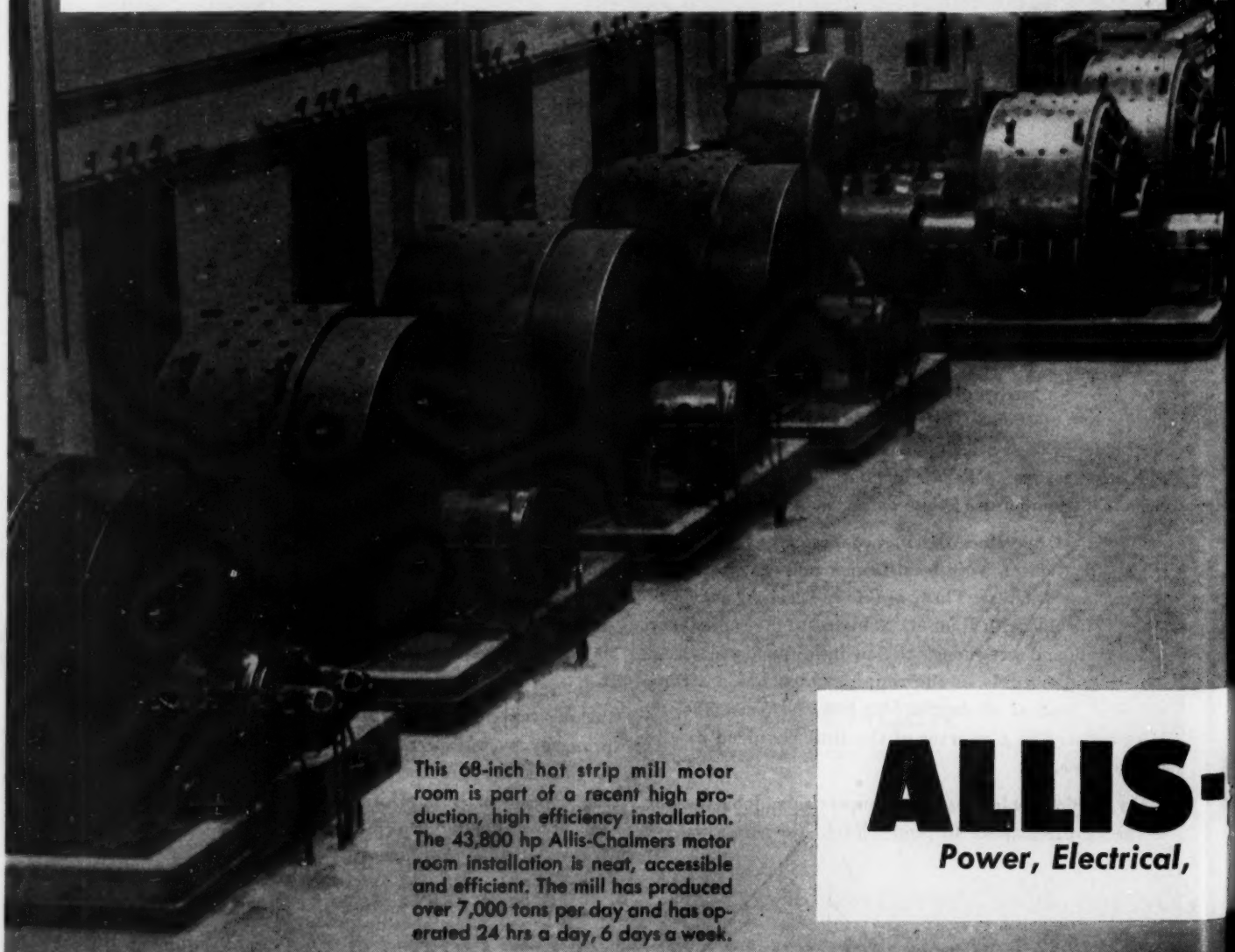
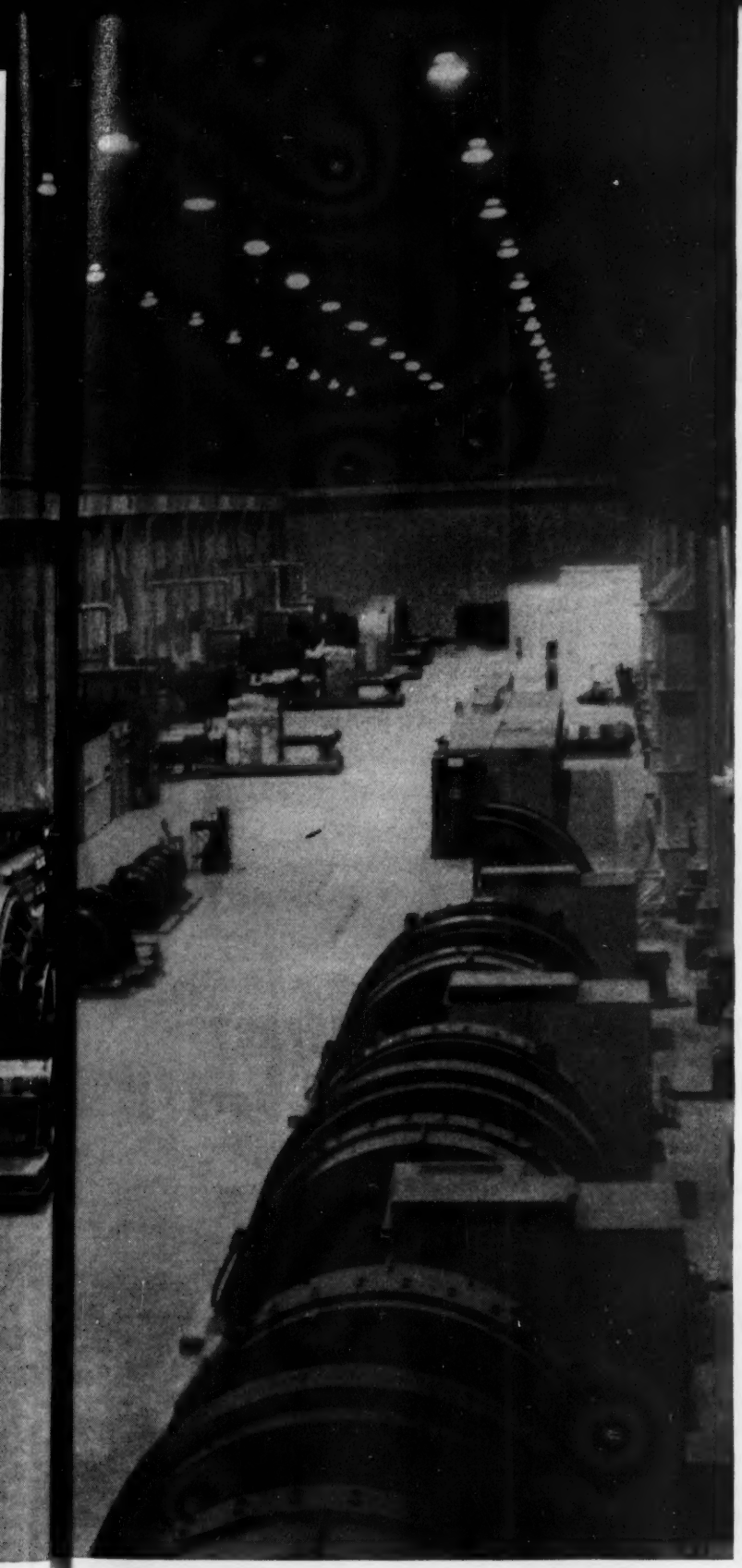


This 68-inch hot strip mill motor room is part of a recent high production, high efficiency installation. The 43,800 hp Allis-Chalmers motor room installation is neat, accessible and efficient. The mill has produced over 7,000 tons per day and has operated 24 hrs a day, 6 days a week.

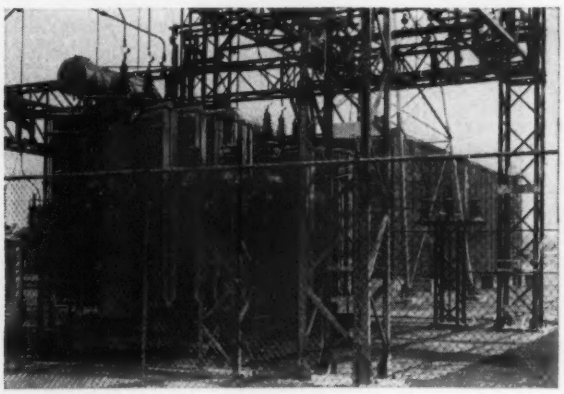
ALLIS-C

Power, Electrical,

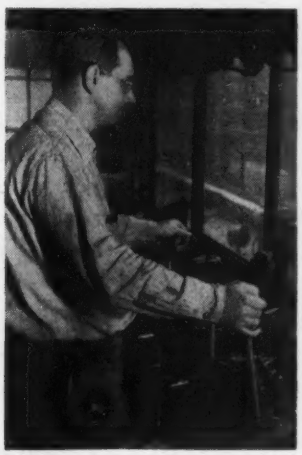


Revamped or New — Mills Raise Output with A-C Equipment!

MOTOR ROOM (left) of 68-inch hot strip mill. Equipment from rear forward includes: roughing scale-breaker motor . . . roughing train synchronous motors . . . two 750 kw rectifiers, exciters, and control . . . finishing train d-c motors . . . motor-generator sets — all Allis-Chalmers.

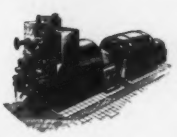


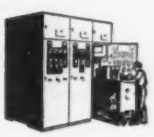
OUTDOOR SUBSTATION for the motor room has two Allis-Chalmers oil-filled power transformers, rated 15,000 kva, 34,500/6900 volts.



PULPIT CONTROL for both the finishing mill (left) and the roughing mill were built by A-C. The finishing mill control system includes the *Regulex* exciter that controls the 50 kw exciter for the fields of the six 3000 kw main generators. Speeds of 2000 fpm are recorded at the number 11 stand.

A-C ALLIS-CHALMERS





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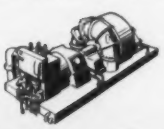

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"Blue Center" Steel—made only by Roebling—provides shock resisting stamina and toughness. The Preforming process—improved and perfected—simplifies installation, reduces whipping and vibration, improves winding. It is not inclined to twist and kink . . . is easy to handle and install . . . can be cut without seizing. This combination of advantages gives unsurpassed life and serviceability.

Roebling Wire Rope is one of the best-known products in industry today. There's a type and size for every kind of service. Have your Roebling Field Man suggest the *one* rope best adapted to your requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST ROEBLING OFFICE AND WAREHOUSE

Atlanta, 934 Avon Ave. ★ *Boston*, 51 Sleeper St. ★ *Chicago*, 5525 W. Roosevelt Rd. ★ *Cleveland*, 701 St. Clair Ave., N. E. ★ *Denver*, 1635 17th St. ★ *Houston*, 6216 Navigation Blvd. ★ *Los Angeles*, 216 S. Alameda St. ★ *New York*, 19 Rector St. ★ *Philadelphia*, 12 S. 12th St. ★ *Pittsburgh*, 855 W. North Ave. ★ *Portland, Ore.*, 1032 N. W. 14th Ave. ★ *San Francisco*, 1740 17th St. ★ *Seattle*, 900 First Ave.

ROEBLING

☆ *A CENTURY OF CONFIDENCE* ☆

STRENGTH COMBINED WITH BEAUTY

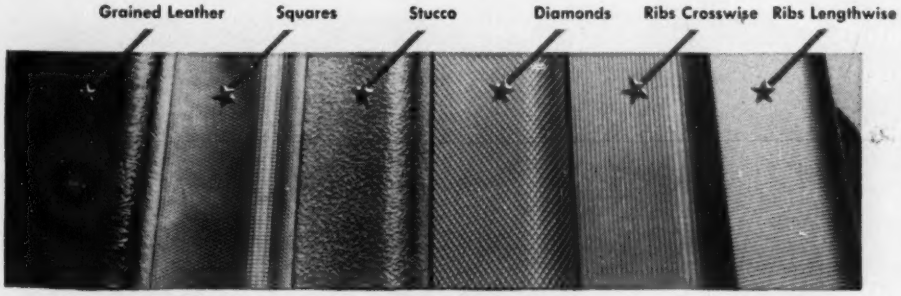
You get both with the new Reynolds Embossed Aluminum sheet finishes

● Designers' acceptance of the new Reynolds Embossed Aluminum patterns has spread rapidly—customers now acclaim it. The beauty of these smart new finishes is instantly apparent but it requires years of rugged wear to appreciate the greater rigidity, the scuff-resistant qualities embossing provides.

Above you see how three of the patterns serve in a modern motor bus interior. Ceiling is a vertical rib design; pleasing appearance and glare-reducing qualities mark its use at this point. On the dash panel a horizontal rib design adds a note of smart styling. Seat backs are protected by a diamond pattern—they take rough treatment, scuffs, dents and scratches, without showing wear. No other material serves so well, with so little maintenance, at such a low original cost.

If your product can use these new benefits without the addition of new costs, consider the range of attractive embossed patterns shown below. Remember you get a naturally pleasing finish, but it may also be painted when desirable. Scuffs and scratches are concealed by the pattern, and aluminum can be formed to modern contours, in most cases without new tool costs.

You get three times the material for production and reduced dead-weight because aluminum is ⅓ the weight of most metals. To see how your production picture can be brightened by Reynolds Aluminum, call your local Reynolds distributor or sales office listed under "Aluminum" in your classified telephone directory, or write to the address below.



FINISHES FOR ALUMINUM

Send your request for this informative book on your company letterhead and receive a copy without charge.

REYNOLDS METALS COMPANY, Aluminum Division
2520 SOUTH 3rd STREET • LOUISVILLE 1, KY.

IF YOU SEE RUST... YOU KNOW IT'S NOT ALUMINUM

REYNOLDS METALS

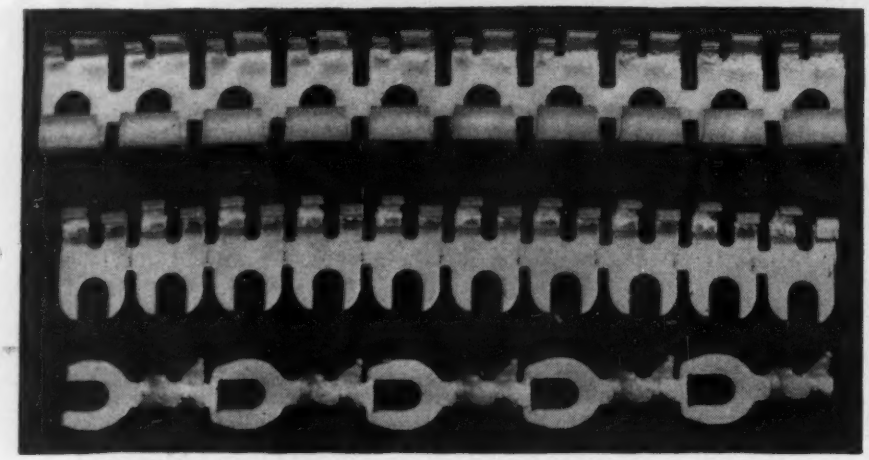
REYNOLDS *Lifetime* ALUMINUM

THE COMPLETE ALUMINUM SERVICE FROM BASE METAL TO FINISHED PARTS

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by BRIDGEPORT BRASS COMPANY "Bridgeport" Headquarters for BRASS, BRONZE and COPPER



Self-soldering tandem terminals are attached by machine which contains heating unit. Courtesy Patton-MacGuyer Co., Providence, R. I.

Cutting Costs by Mechanizing Slow Hand Operations

Elimination of expensive hand operations is one of the important ways open to fabricators for substantially cutting costs.

This is always a challenge to the ingenuity of machine and product designers to develop methods for changing old-time hand operations to semi or completely automatic cycles. This may involve both the development of a special-purpose machine and the redesign of the product itself.

Cutting High-Cost Soldering

The method for soldering copper terminals to insulated wires is an example of such cost-cutting. Originally the terminals were handled individually and required fluxing, tinning, bending and soldering with either an open flame or soldering iron.

The mechanization of this job involved the development of a machine to do the job automatically, with the exception of inserting the wires. It also required redesigning the terminals in strip form.

Progressive dies were made to blank, pierce and bend the terminals but not clip them off. This permitted tinning and depositing the solder on a mass production basis. The fact that the terminals remain joined until fed into the machine does away with the troublesome problem of hand feeding individual terminals which tend to tangle up.

The machine feeds the roll of tandem terminals into a die. When the wire is inserted and the lever tripped, the die closes, cutting off a single terminal, bending the locking lugs around the wire and simultaneously applying heat to melt the solder. Instead of a few hundred by hand, the machine is capable of producing 1200 or more assemblies per hour.

Copper-Base Alloys Can Help Cut Fabricating Costs

Copper, with its high electrical conductivity, is eminently suited for this job. It can be blanked, formed and clipped with minimum power.

It is extremely ductile which permits the cold bending of locking lugs around the wire without breaking. Copper's high heat conductivity makes it possible to heat the terminal speedily, and dissipate the heat rapidly when the current is shut off.

Product designers interested in cutting production costs will appreciate the fine workability and versatility of the copper-base alloys. Much valuable information on the characteristics of copper, brass, tin, bronze, silicon bronze and aluminum bronze can be gleaned from Bridgeport's Technical Handbook. Contact our nearest Bridgeport sales office for technical help on your metal problems.

Bridgeport Warehouse Service

Are you making adequate use of Bridgeport Warehouse Service?

Large stocks of brass and copper mill products carried in Bridgeport warehouses at Chicago, Cleveland, St. Louis, Minneapolis, Newark, Providence, Houston, Denver, Los Angeles and San Francisco complement the mills at Bridgeport, Conn., and Indianapolis.

Here are six ways that our warehouse service can help you:

1. *Emergency Shortages*—Whenever additional metal is needed to finish a job it can be picked up quickly without interrupting production.

2. *Rush Orders* — Use warehouse stocks as a fill-in while waiting for mill shipments.

3. *Short Runs*—Metal should be obtained from warehouses instead of waiting for mill to make up small lots to order.

4. *New Products and Trial Runs* — Buy as much or as little as you require until experimental stage is completed.

5. *Slitting Service* — Should be used for converting any stock you may have on your shelves to usable widths. This also makes Bridgeport warehouse stocks more flexible.

6. *Cautious Buying* — Warehouse stocks should be used for hand-to-mouth purchasing.

Warehouse Stocklist Available

Bridgeport's Warehouse Stocklist will be mailed upon request. This booklet also contains a valuable technical digest on the properties of most commonly used copper-base alloys. Write to nearest Bridgeport Office for your copy.

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

Limitations of Cathodic Protection

Indiscriminate application of cathodic protection cannot be made without carefully studying the whole problem. For example, in sea water the accumulation of alkaline materials at the cathode surface may result in an increase in pH value. A relatively strong alkaline solution accumulating on the surface of lead, zinc, and aluminum (amphoteric metals) will lead to greatly *increased* corrosion rather than decreased corrosion, since these metals are very soluble in alkalies. However, these alkalies scarcely attack steel and copper alloys.

The bond between coal tar, asphalt and other types of coatings applied to metals for protection may be destroyed by the alkalies developed by the action of the current on the salt solution.

Objectionable heat insulating calcium - magnesium - hydroxy - carbonate scales may form on the surfaces of copper and copper alloy heat exchanger tubes in sea water where cathodic protection is applied.

Local shielding of the surface by some object such as a deposit of sludge, cinders, baffle plate, etc., will interrupt cathodic protection. Such shielding prevents the impressed current from reaching the covered spot and allows the formation of a strong local anodic area, which undergoes rapid corrosion.

Increased flow of water over the cathodic surface will lead to a loss of protection, since the alkaline materials, etc., collecting on the cathodic surface are carried away. When such a change occurs, it is necessary to increase the magnitude of the current originally set up in order to offset this effect.

Breaks in the continuity of the electrical circuit leads to deep, local corrosion where the current leaves one section of the metal structure in the circuit on its way to some other point. It is necessary to tie into the electrical circuit all parts of the equipment to be protected. Obviously, cathodic protection should be cautiously applied and carefully designed.

For references and a discussion of the fundamentals and application of cathodic protection see: H. H. Uhlig, "Corrosion Handbook", pp. 923-950, John Wiley & Sons, Inc., 1948.

Did You Know...

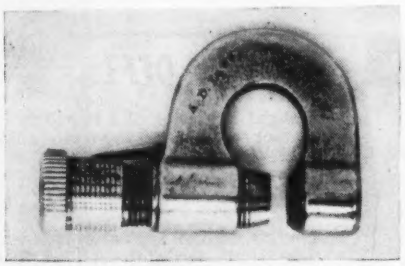
Bridgeport Brass Developed First Mike?

It was 1867, two years after Bridgeport Brass was founded. The Union Metallic Cartridge Company (now Remington Arms) had returned a quantity of brass because it was "out of gauge".

S. R. Wilmot, superintendent, applied his "finger" gauge on several rolls and stoutly denied the charge. However, the customer's gauge did not agree with Mr. Wilmot's, or with a third.

Mr. Wilmot then took matters into his own hands and called in Mr. Laws, of the Mechanical Department. He demanded a gauge with a calibrated moving part that would measure thicknesses accurately.

Meeting emergencies was nothing new to Bridgeport Brass and soon the first "mike" was born. Mr. Laws made five more to fulfill requests from most important customers, but when more were called for, he rebelled. The firm of Joseph R. Brown and Lucian Sharpe was asked to take this task off his hands.



Granddaddy of the micrometer caliper—designed and made by Bridgeport Brass in 1867.

With some minor modifications in the method of reading, the micrometer caliper of today is essentially the same as the one which Bridgeport developed for its own use in 1867.

Industry is indebted to Bridgeport Brass for this universal instrument of precision.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items have been tested or are endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

New Plating Rack Coating, 100% solids, is said to give a sound coating in only two dips. Provides good protection and insulation to rack in all types of electroplating and anodizing solutions, it is claimed. **No. 948**

Wire Stripping Tool is reported to grip, cut and strip insulation in one operation, with no possibility of nicking or cutting wire or fraying wire ends. **No. 949**

Coil Straightening Machine has a coil capacity of 6000 pounds of strip up to 36 inches wide. Variable speeds from 225 to 900 feet per minute. **No. 950**

Quick-Drying Metal Primer is said to make it possible to apply two coats of paint over metal in a single day. Dries to touch in 10 minutes, can be handled in 20, and may be painted over in 30 minutes to an hour. **No. 951**

Steel Strap Selector is said to help in the proper selection of length and weight of strap required for any given binding or packaging operation. Also helps in selection of material best suited to conditions to which strapping will be exposed. **No. 952**

Abrasive Compounds made with water soluble base are offered in three different grades especially suitable for use in grinding and lapping-in brass or bronze tapered plug or key cock valves. **No. 953**

New Adapter converts any ¼" drill into a compact, efficient power hammer suitable for use for moderately heavy hammering. May be operated in drill press and delivers one blow per revolution. **No. 954**

Improved Keyway Push Broach is said to require no guide since it supports itself in hole. Only one pass is required to complete standard depth. Available in keyway widths from 1/32 to 1/4" for any desired hole diameter. **No. 955**

Two-Tone Lacquer Finish can be produced with one coat of new material, it is claimed, at lower cost than for two coat methods. Ready to apply by spraying, it air drys hard in 20 minutes, simulating hammered finish in two colors. **No. 956**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

"Bridgeport" BRASS

BRIDGEPORT BRASS

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865

Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal

Warehouse Service with Slitting Facilities in Principal Cities

Advertisement

HOW "GRAY PLATE" was eliminated in automatic CHROMIUM PLATING

1.

COSTLY PROBLEM:

Instead of a flawless, sparkling chromium finish, an automatic plating machine was turning out too many pieces of "gray plate" in this plant. These rejects were piling up needless refinishing costs and blocking the way to full productivity. Strangely enough, everything in the plating cycle checked up OK.

2.

BAFFLING CASE. The plant chemist and foreman could find no reason at all for the trouble. Cleaners were perfect. Nothing wrong with the plating baths. The machine was working smoothly.

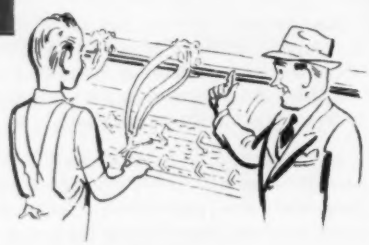
3.

LET'S GET TO THE BOTTOM OF THIS. There *must* be an answer. Let's see what United Chromium has to say. They've got the know-how.

4.

PUTTING THE FINGER ON IT. After testing, the U.C. engineer suspected that chromium was being plated on a *passive*, rather than *active*, nickel undercoat. The two look alike, but one means bright chrome, the other a reject.

5.



X MARKS THE SPOT. Sure enough, there was a 15 second lag between the time work was immersed in the chromium bath and contact made. Even in that short time, the nickel was turning passive.

6.

THE PAY-OFF!

A slight extension of a bar to make contact sooner—and the trouble was gone! The full productive capacity of the machine was used for perfect finishing!

• • •

There's further typical evidence of how UC Technical Service works to keep you ahead on chromium plating. For 21 years, it has been looked upon by chromium platers as security against troubles and needless expense. Wouldn't you like to avail yourself of this profit-guarding service? More details in our CR-2 bulletin. Write today.

UNICHROME

Trade Mark Reg. U. S. Pat. Off.

PROCESSES AND MATERIALS FOR SURFACES THAT SURVIVE

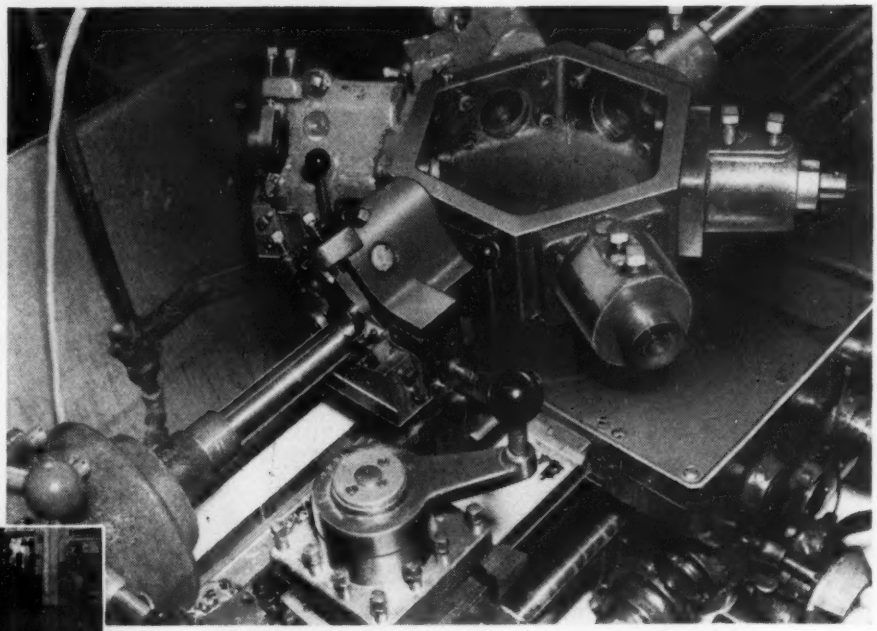
UNITED CHROMIUM, INCORPORATED

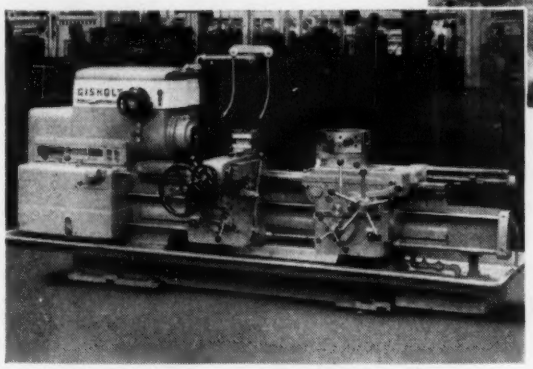
51 East 42nd St., New York 17, N. Y. • Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio • Los Angeles 13, Cal.

take shaft jobs Like This:

they take less time on GISHOLT TURRET LATHES

Yes, even in lots as small as 5 or 10 parts, you can't beat turret lathes on this kind of work. Parts are machined complete in 2 operations—total time is less than 4 min.





no extra equipment needed!

With no more than your standard bar equipment, you're all set to cut machining costs on shafts like these. No previous operations . . . such as cutting to length or centering . . . are necessary. And with *two or more tools* from turret and side carriage, you have the basic advantage of turret lathe economy—the time saving that means lower costs.

Before you turn to extra equipment or special attachments, look into the possibilities of doing the job the quick and easy way on Gisholt Turret Lathes. Gisholt engineers will gladly help you.

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN

TURRET LATHES · AUTOMATIC LATHES · SUPERFINISHERS · BALANCERS · SPECIAL MACHINES

BRAZING MILES OF STEEL FINS AND TUBING WITH G-E ELECTRIC FURNACES

As reported in STEEL*

"BEHIND-the-scenes mechanical factor responsible for the high volume production of finned condensers in the Buffalo plant of Fedders-Quigan Corp., is the latest type roller hearth, controlled atmosphere brazing furnace. Combined with other up-to-date materials handling and processing equipment, it not only is aiding the company to join literally miles of steel fins and tubing in speed-up fashion, but also is saving vast quantities of materials over the old manual 'solder dip' methods employed previously."

*"Automatic Brazing Speeds Output of Steel-Finned Condensers" by Jay DeEulis, Engineering Editor, in STEEL, February 7, 1949.

General Electric builds electric furnaces and associated equipment for practically every industrial heat-treating process. For more information on G-E Furnaces or on G-E Induction and Dielectric heating equipment, consult the nearest G-E office; an Industrial Heating Specialist will be glad to make specific recommendations for your particular job or write to Apparatus Dept., Sect. 720-3, General Electric Co., Schenectady 5, N. Y.

ELECTRIC FURNACES

ANNEALING • BRAZING • DRAWING
CARBURIZING • ENAMELING • HARDENING
NORMALIZING • SINTERING

You can put your confidence in—

GENERAL ELECTRIC

Where steel slits steel...

Heppenstall Quality Counts!

Heppenstall rotary slitter and trimming knives are establishing high performance records wherever strip steel is cut. These knives remain in service longer because they fulfill the rigid Heppenstall requirements of quality in the base metal *plus* quality of workmanship.

To assure the utmost in quality, Heppenstall's Electric Induction Steels are specified and held to the closest ranges of chemical composition . . . thus yielding a clean, sound, homogenous base metal. The Heppenstall operations of forging, annealing, machining, heat treating, and grinding are then performed with meticulous care. The end result: the finest knives obtainable.

Equip your mill with Heppenstall slitting and trimming knives and prove their record breaking service and unusual stamina under your own operating conditions.

60th ANNIVERSARY
1889 1949

Heppenstall
THE MOST DEPENDABLE NAME IN FORGINGS
PITTSBURGH BRIDGEPORT DETROIT

FERRO-SILICON

Tepco Ferro-Silicon, produced in our electric furnace plant at Chattanooga (formerly Southern Ferro-Alloys Company, Chattanooga, Tennessee), possesses to a high degree those qualities sought by steel men in this special alloy. Tepco facilities for supplying this product to the steel industry in any specified grades and sizes eliminate any chance of delay or bottle-neck.

We are prepared to meet your requirements in 50%, 65% and 75% standard and low impurity grades. Tepco Ferro-Silicon is shipped in all sizes from lump through 150 mesh by down, packaged or in bulk. Also available in briquettes, the 2½-pound briquettes containing one pound of silicon and 5-pound briquettes containing two pounds of silicon. Special grades and sizes quoted on request.

PIG IRON

Diamond D Pig Iron—low-phosphorous, low-silicon, high-carbon, machine-cast—produced at our Wrigley Charcoal Plant at Wrigley, Tennessee.

Rockwood Pig Iron—malleable and foundry, machine cast, produced at our Rockwood, Tennessee, plant.

FOUNDRY COKE

Chattanooga By-Product Foundry Coke—produced from properly blended coals to furnish high-grade foundry coke. Widely used by foundries in the Southern area.

Chattanooga coke is also available in smaller sizes.

We will be glad to discuss with you, at any time, the numerous advantages of our plants and products.

TENNESSEE PRODUCTS & CHEMICAL CORPORATION

GENERAL OFFICES: NASHVILLE, TENNESSEE

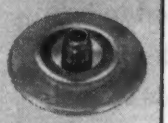
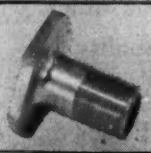
PLANTS AT CHATTANOOGA, ROCKWOOD AND WRIGLEY, TENN.

Represented by

MILLER & CO., Chicago, St. Louis, Cincinnati; S. H. BELL CO., Pittsburgh; T. H. BENNERS & CO., Birmingham

EXPORT AGENTS: ORE & FERRO CORPORATION, 30 Broad St., New York

PRODUCTION RECORD

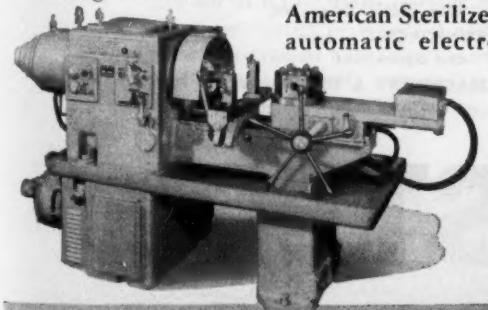
PART	PART NAME	OPERATIONS	PRODUCTION	COST	NOTES
	½" UNION NUT	TAP, BORE, CHAMFER, CUT OFF	UP 112.9%	DOWN 52.7%	CHANGE FROM CASTING TO BAR STOCK–ELIMINATE MILLING OPERATION
	½" FEMALE SPUD	BORE, TURN, TAP, SEAT	UP 44.2%	DOWN 30.8%	COMBINATION TOOLING
	¾" MALE SPUD	TURN, THREAD, SEAT	UP 38.2%	DOWN 26.8%	COMBINATION TOOLING
	½" GLOBE VALVE BODY	TURN, THREAD, SEAT	UP 25.0%	DOWN 20.4%	COMBINATION TAPPER AND THREADER
	VALVE REGULATOR VALVE BODY	BORE, TAP, THREAD	UP 44.4%	DOWN 32.3%	COMBINATION TAPPER AND THREADER
	TOP FLANGE CONTROL VALVE	DRILL, TAP, TURN, FACE, THREAD, CHAMFER	UP 121.1%	DOWN 56.3%	COMBINATION TURN AND FACE
	1" FLOOR FLANGE	DRILL, TURN, THREAD	UP 116.7%	DOWN 53.0%	COMBINATION TURN, FORM AND FACE

Electro-Cycle TRADE MARK BOOSTS PRODUCTION 70.5% at American Sterilizer

● This chart shows what happened on seven typical brass jobs when the American Sterilizer Company of Erie, Pennsylvania, routed them to its new Warner & Swasey 16" Electro-Cycle Turret Lathes.

Using semi-skilled instead of skilled operators, American Sterilizer found that automatic electronic headstock control and faster, easier machining raised production an average of 70.5% and dropped costs 38.9%!

Find out how the Warner & Swasey Electro-Cycle Turret Lathes can boost output and cut costs for you. Call your nearest Warner & Swasey representative or write–



You can machine it better, faster, for less . . . with a Warner & Swasey

WARNER & SWASEY
Machine Tools
Cleveland

TURRET LATHES, MULTIPLE & SINGLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

How to streamline Your Steel Inventory

During the past period, steel users naturally have been most interested in getting the steel they needed without too much emphasis on quality. Inventories were built up as much as possible because of excessive demand and uncertain supply.

Now, the time has come when industry can begin to streamline inventories and can place more emphasis on quality. While a few products remain on the critical list, a balance between supply and demand has been reached for most steels. Under these conditions, yesterday's "normal" inventory may loom large and steels of doubtful ancestry may prove a liability.

We are glad to be in a position again to recommend that you keep your inventory at a practical working level and use our warehouse stocks as your inventory reserve. The many Ryerson Steel-Service Plants throughout the country are particularly well equipped to help you keep your inventory streamlined. Carbon, alloy and stainless steels in thousands of analyses, shapes and sizes are ready for quick shipment—and their uniform high quality is assured by our Ryerson Certified Steel Plan.

So don't let changes in market conditions or product design catch you with high inventories. As warehouse stocks improve we suggest that you extend a conservative buying policy over an increasing range of your steel requirements and keep in touch with us for your current needs.

PRINCIPAL PRODUCTS

BARS—carbon & alloy, hot rolled & cold finished
SHAFTING—cold finished, ground & polished, etc.
STRUCTURALS—channels, angles, beams, etc.
PLATES—sheared & U. M., Inland 4-Way Floor Plate
SHEETS—hot & cold rolled, many types & coatings
TUBING—seamless & welded, mechanical & boiler tubes
STAINLESS—Allegheny bars, plates, sheets, etc.
REINFORCING—bars and accessories
MACHINERY & TOOLS—for metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

the best way to avoid expensive handling systems

Economists and industrial engineers predict that the last great unexplored area for lowered factory costs will be found in the field of materials handling. We believe they are right. But economies from laborsaving handling systems are only *part* of the answer.

It's equally important to *reduce the need for handling*—by using fewer machines and keeping them loaded. That's where Acme-Gridley bar and chucking automatics can help.

Unless your appropriations committee is fully familiar with the versatility of modern Acme-Gridleys—and their ability to give you more good pieces in the pan, economically, *around the clock*—they may overlook this lucrative way of cutting costs. Below is printed one typical case study. Could you use a file of similar examples, to help prove your point? Ask us for them.

CUT THIS OUT FOR USE WHEN YOUR APPROPRIATIONS COMMITTEE WANTS PROOF

AN ACME-GRIDLEY CERTIFIED CASE STUDY

THIS IS WHAT HAPPENED:

PART TURNED—Brass Magnet Shaft

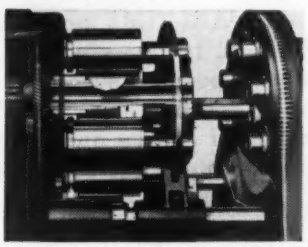
MACHINE—9/16" Acme-Gridley RA 6-Spindle Bar Automatic

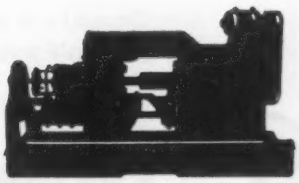
OPERATIONS PERFORMED—Fifteen, to machine part complete, including a square hole—and counterbore of large end, plus pickoff

TIME—5 seconds

AND HERE'S ONE IMPORTANT REASON:

Typical of many design features that permit Acme-Gridley automatics to maintain accuracy under conditions of sustained heavy-duty operation is the stock reel disc, independently operated through a separate shaft and gear. With this arrangement, the load is not thrown on the spindle carrier while indexing; the tendency to spindle whipping is eliminated; there is no excessive wear on spindle bearings and carrier.





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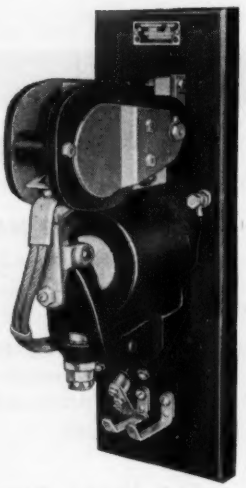

Clark Bulletin 7400
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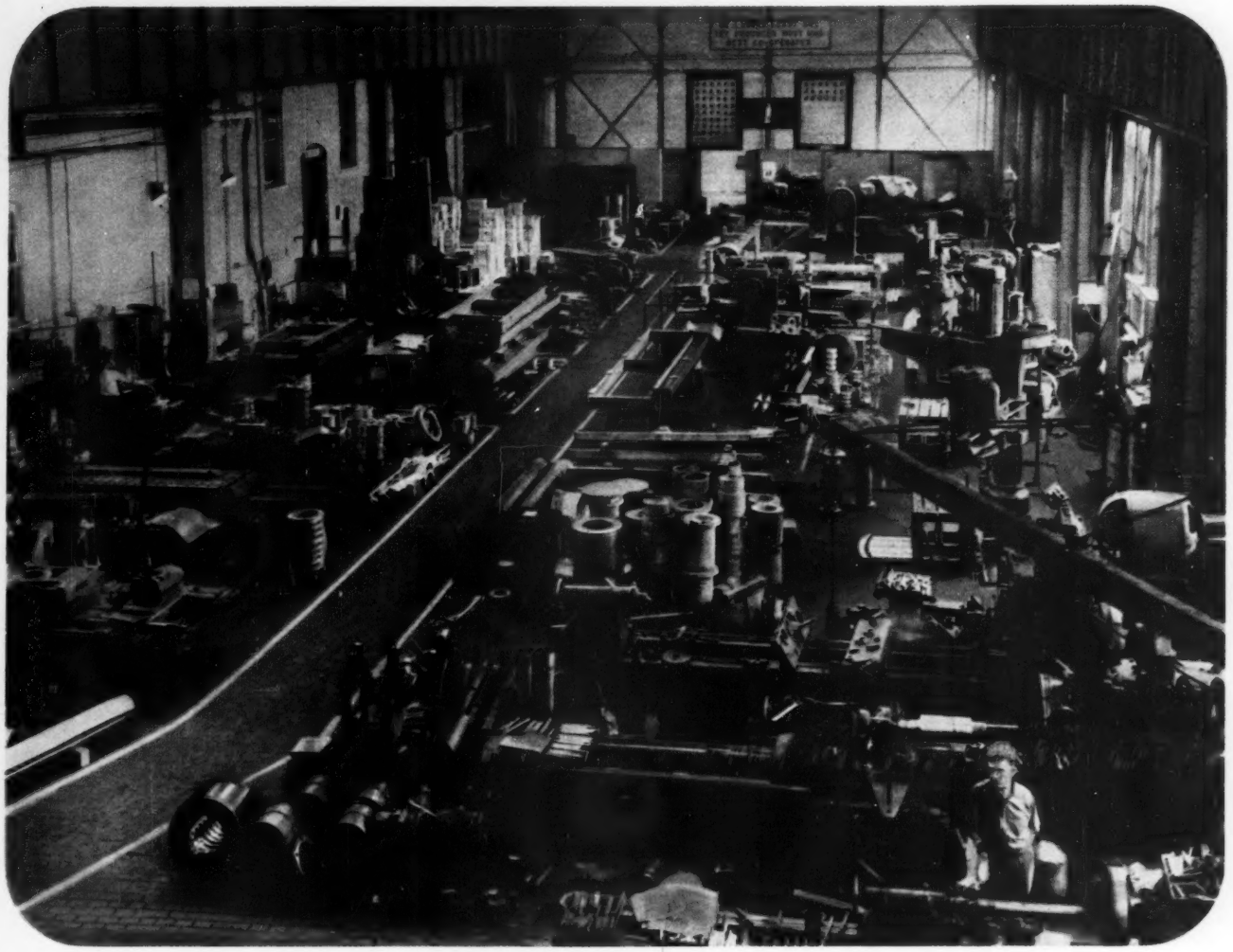
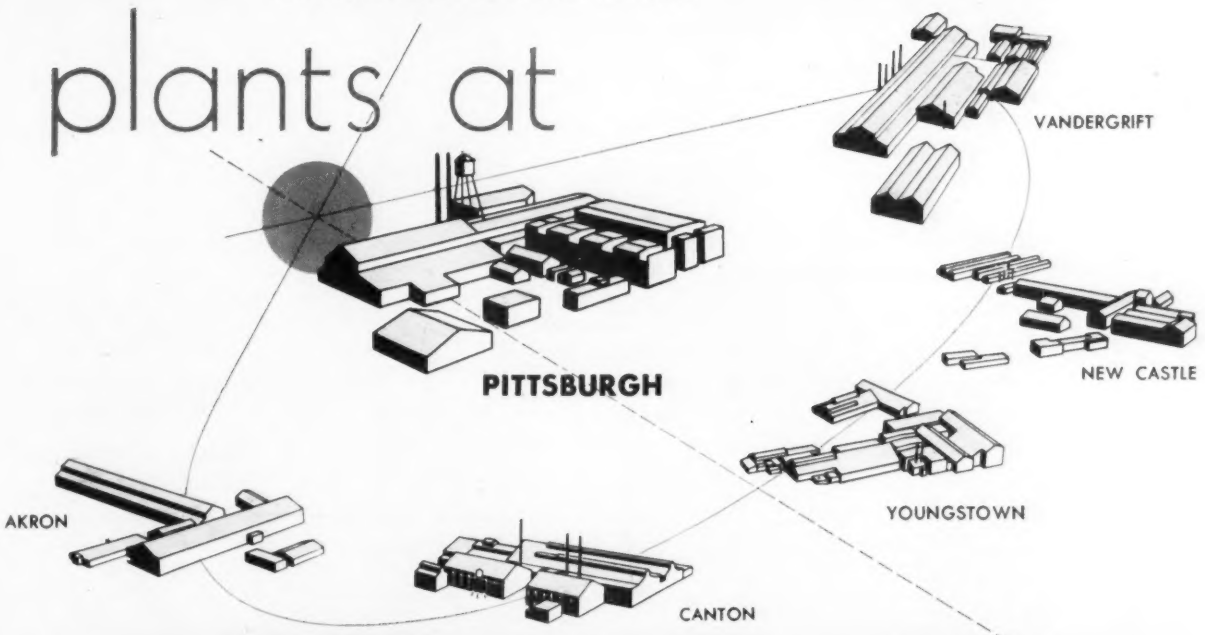


View of Machine Shop, Frank-Kneeland Plant Pittsburgh, Pa.

plants at



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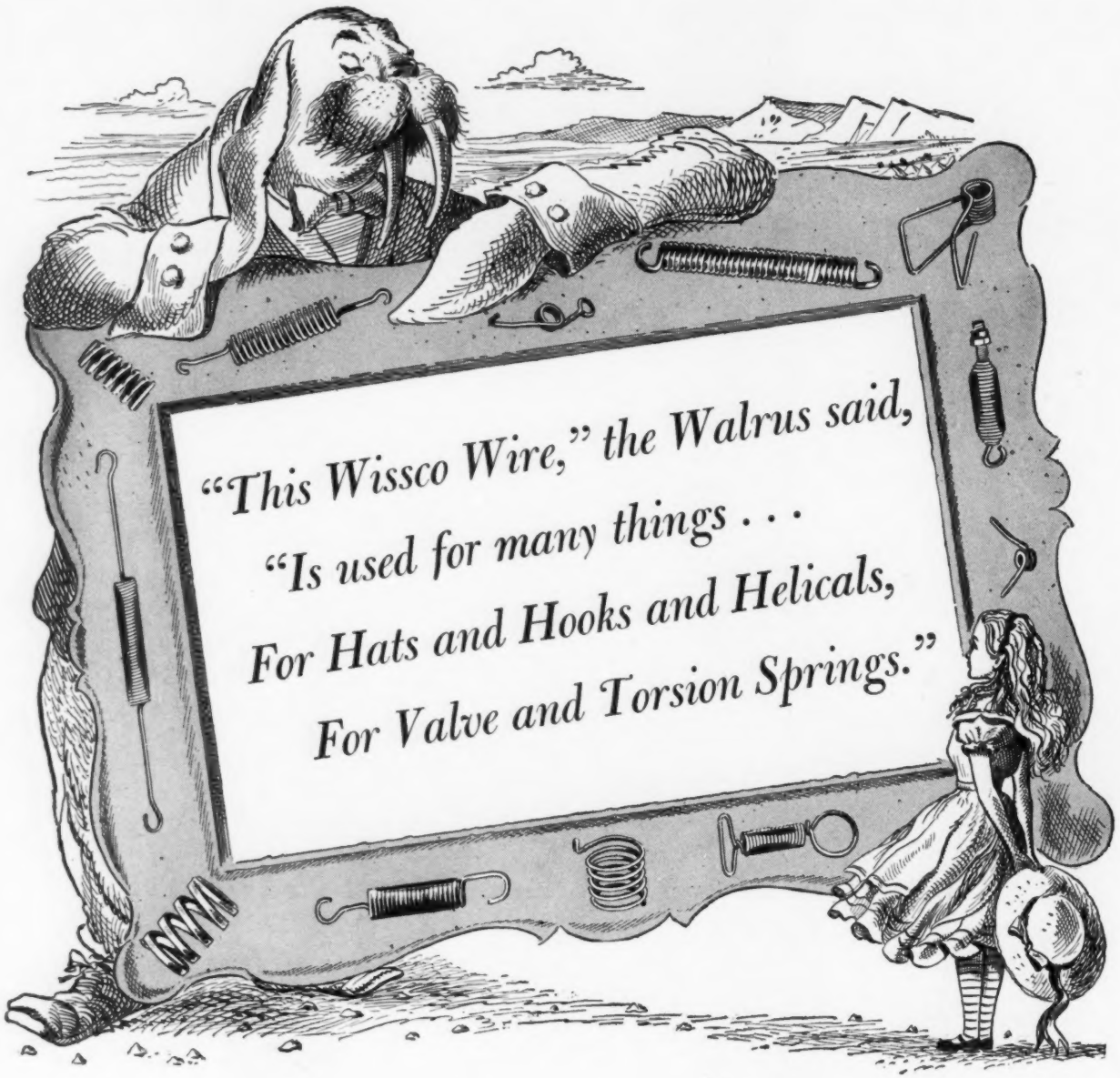

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Photos courtesy Ford Motor Company

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R-327

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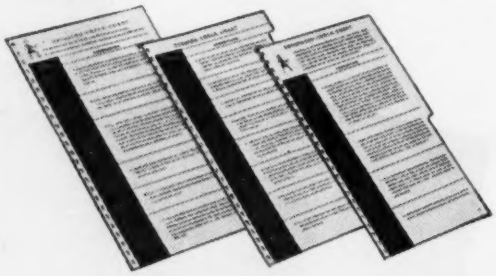

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DETAILED SKETCHES ON TOOL GRINDING—Angles and clearances for all types of common tools are described, along with detailed working information and grinding, stoning, lubrication, etc.

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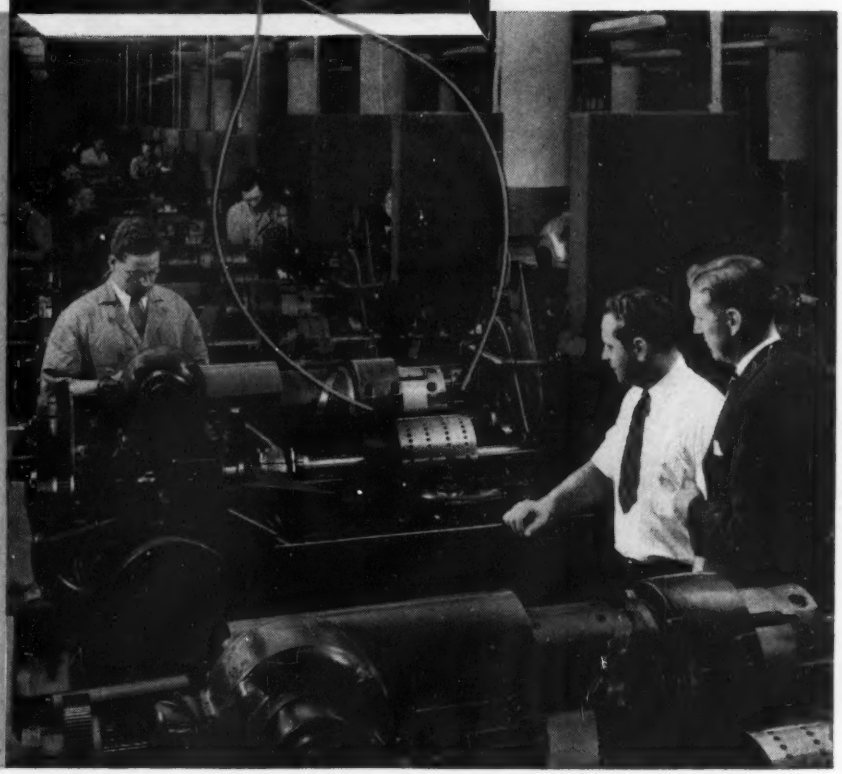
says this Screw machine Superintendent.

Screw machine Superintendent consults with a Gulf Lubrication Engineer (right) on the performance of Gulf Stainless Cutting Oil B.



"We have stepped up production on all of our single spindle automatic screw machines since we switched to Gulf Stainless Cutting Oil B," says the screw machine Superintendent of a New England manufacturing plant. "We now take heavier cuts at increased feeds—and we're getting unusually good finishes for this type of job."

A typical report from the scores of plants which have improved production and tool life through the use of Gulf Stainless Cutting Oil B. In addition to its outstanding performance as a cutting oil, Gulf Stainless Cutting Oil B also provides excellent lubrication for the working parts of machine tools. Thus it serves as an ideal dual-purpose oil in machines using one oil as both lubricant and cutting oil. This quality oil is non-corrosive to finished metal surfaces.

Ask a Gulf Lubrication Engineer to demonstrate the advantages of Gulf Stainless Cutting Oils and other quality cutting oils from the complete Gulf line in your shop. Write, wire, or phone your nearest Gulf office today.

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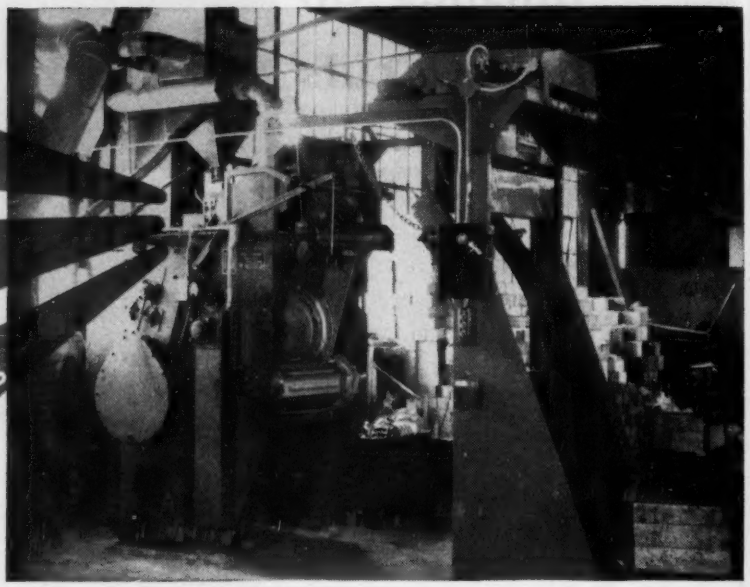

The many savings that accrue from the use of the Wheelabrator method of Airless Blast cleaning have been proved again. Installation of a 27" x 36" Wheelabrator Tumblast (5 cu. ft. capacity) at the Boston & Lockport Block Co. of East Boston, Massachusetts, completely revolutionized their cleaning operation. Loads averaging 400 lbs. of forged steel tackle blocks are now cleaned in ten to fifteen minutes. By previous methods, even smaller loads had to be tumbled for 20 minutes and then pickled for a period of one to eighteen hours, depending upon the type of forging.

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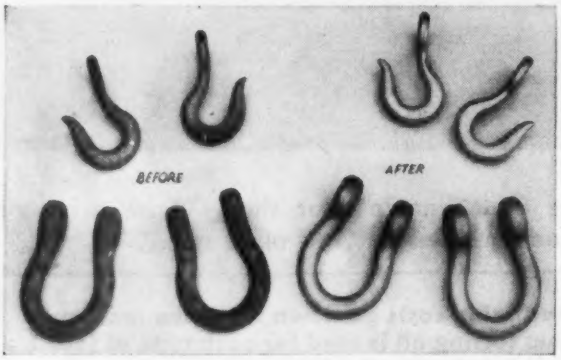

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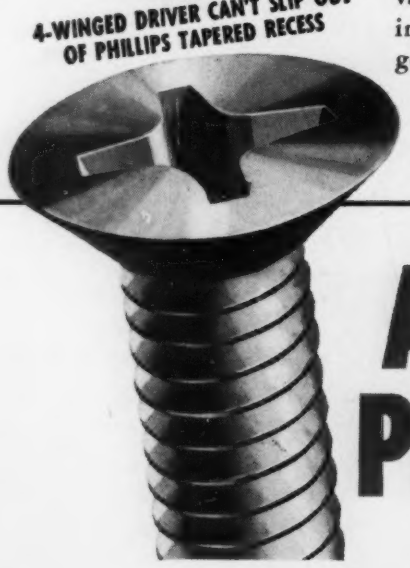

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Helpful Literature

72. Radial Roller Bearings

American Roller Bearing Co.—12-page illustrated catalog No. 1012 gives complete information on line of stamped steel cage type radial roller bearings. Bearing races and rollers are made from high carbon, high chrome steel.

73. Air Valves

Gerotor May Corp.—20-page illustrated catalog No. 301 describes 21 models of four-way air valves. Suitable for pressures up to 150 pounds per square inch, air valves are shown in hand, foot, solenoid, cam and pilot types.

74. Electronic Servo Systems

Askania Regulator Co. — 10-page illustrated booklet "Askania Electronic Servo Systems" explains operating principles of electronic servo system which transmits reliably and accurately adjustments to any point within radius of 1000 feet. Typical uses are adjusting air pressure in converter plants regulating blast furnace blowers, readjusting flow rates in centralized flow distribution systems, and adjusting ratio controllers.

75. Specimen Preparation

Precision Scientific Co.—32-page illustrated catalog 860NR describes complete line of laboratory apparatus and accessories for preparation of metallographic specimens. Included are automatic polisher, submerged specimen cutter, semiautomatic mounting press and hand operated mounting press and polisher, with accessories.

76. Conveyor Belts

B. F. Goodrich Co.—4-page illustrated folder entitled "The Conveyor Belt With the Non-Skid Cover" cites case studies of successful applications of Griptop conveyor belts which transport, without slippage, ice up 7 per cent grades; small coal up inclines as high as 28 degrees; and boxes, cartons, sacks and luggage up slopes of 28 degrees.

77. Lathe

Pratt & Whitney—24-page illustrated circular No. 509 describes model C lathes available in 12, 14 and 16-inch sizes. Specifications, components, features and accessories are listed.

78. Metal Fabrication

L. O. Koven & Brother, Inc.—24-page illustrated bulletin No. 490 entitled "Men, Facilities, and 'Know How'" presents facilities available for fabrication of metals in all gages from 18-gage to the heaviest metal. Company is metal fabricator of standard and special equipment and apparatus for processing, material handling and storage for all industries.

79. Expansion Joints

Chicago Metal Hose Co.—28-page illustrated "Design Guide to Expansion Joint Selection and Application" contains data to simplify proper selection of size and type of expansion joints for piping systems to fulfill varying requirements of temperature, pressure and other factors involved.

80. Precision Castings

Carbide & Carbon Chemicals Corp.—4-page form F-7250 relates recent advances in controlling gelation of ethyl silicate during preparation of investments for precision castings.

81. Fork Lift Trucks

Towmotor Corp.—4-page illustrated job study No. 88 represents analysis of handling operations at specific company and is designed to aid in solving individual materials handling problems.

82. Automatic Screw Machine

Greenlee Bros & Co.—2-page illustrated catalog No. A-402 describes automatic screw machine designed for short and long run jobs. Complete specifications are given for this machine which is engineered for quick set-ups and easy operation.

83. Tool Holders

Bokum Tool Co.—4-page illustrated catalog No. 483 and price sheet give information on boring and threading tool holders with vertical adjustment which accommodate complete line of Bokum tools. They provide convenient means of setting up tools accurately in lathes.

84. Thread Gages

Swedish Gage Co. of America—4-page illustrated bulletin on model LL reversible thread gages lists advantages of these units which have twice the length of standard AGD design thread gages.

85. Bending Roll

Buffalo Forge Co.—8-page illustrated bulletin No. 3344-B gives features of No. OA bending roll which is designed for production bending of angles, flats, pipes, tubes and special shapes. Rolls up to 6 inches wide can be accommodated.

86. Milling Machine

Whiton Machine Co.—2-page illustrated bulletin M-1 gives design, construction and operation features of Whiton special purpose high production milling machine which handles work up to 8 inches in diameter.

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87. Process Instruments

Foxboro Co. — 32-page illustrated bulletin No. 427 presents details of complete line of Dynalog instruments for process measurement and control as well as various auxiliary devices which adapt these instruments to diverse industrial applications. Units are shown for checking temperature, humidity, conductivity, pressure, flow, liquid level, force, position, speed and other process variables.

88. Degreasing Equipment

Detrex Corp.—24-page illustrated bulletin "Detrex Degreasers" discusses advantages of using chlorinated solvent degreasing for fast, efficient and economical metal cleaning. Typical degreasers for practically any production requirements are described. Also covered are alkali washers, emulsion cleaners and processing equipment.

89. Polishing-Buffing Machines

Hammond Machinery Builders Inc. —6-page illustrated folder No. 10 announces new line of ten Junior automatic polishing and buffing machines. Described are models having simple rotating spindles as well as production machines with stroke adjustments up to 12 inches, multiple spindle units and power indexing models.

90. Centerless Grinders

Cincinnati Grinders Inc.—16-page illustrated bulletin No. G-573 describes Cincinnati Filmatic No. 1 and No. 2 Micro-Centric grinding machines which hold roundness within 0.000025-inch and work square with prefinished end or plane surface to same tolerance.

91. Portable Conveyors

J. C. Corrigan Co.—36-page illustrated catalog gives construction details of line of conveyors powered by electric motors or gasoline engines. They are designed to handle bulk materials as well as bags, boxes, crates, cartons and kegs.

92. Adjustable Chuck

Cushman Chuck Co.—Bulletin details operation and adjustment of air chucks with Accralock individual precision jaw adjustment feature which provides means for obtaining very accurate positioning of chuck jaws as well as locking jaw when exact setting has been made.

93. Precision Valves

Hanna Engineering Works—16-page illustrated catalog No. 251 includes descriptions, specifications and features of complete line of valves. Several newly designed valves are shown along with circuit diagrams.

94. Coating Equipment

Industrial Ovens, Inc.—24-page booklet "Blueprint for Industry, Part V" illustrates and describes line of web handling and coating equipment for processing textiles, papers, films and foils. This includes various types of letoffs, coaters, dipping machines, drive rolls, oven units, tensioning devices, system drives, impregnators, fusing ovens, coating systems and dryers.

95. Air Operated Devices

Mead Specialties Co.—48-page illustrated "Industrial Air Power Catalog—1949" lists various types of air cylinders, presses, collet fixtures, timers, impact hammers and air line accessories for industrial application. Included also are examples of air power setups.

96. Flexible Chain Couplings

Morse Chain Co.—16-page illustrated catalog C45-49 lists various types of flexible chain couplings for industrial power transmission including stock silent chain couplings, heavy-duty made-to-order couplings and stock double roller chain couplings.

97. Timing Motors & Devices

Haydon Mfg. Co.—20-page illustrated catalog No. 321 presents line of synchronous timing motors, chart drives, timing devices and clock movements. Included are profile drawings and listings of speeds, voltages, frequencies, shaft sizes and special variations available in each of ten motor series.

98. Stainless Pipe & Tubing

Babcock & Wilcox Tube Co.—4-page illustrated technical data card No. 132 lists condensed data on corrosion resistance, creep strength, oxidation resistance, mechanical properties, machinability, welding characteristics, heat treatment and physical properties of Croloy 18-8Cb stainless pipe and tubing for pressure and mechanical uses.

99. Dryers

Kemp Mfg. Co.—32-page illustrated catalog D-27 features discussion of disiccant-bed drying of air, gases and liquids. Basic principles and specific factors affecting dynamic drying of air, compressed air, gases and various liquids are covered. General operating characteristics of dryer and selection charts for determination of dryer size needed are included.

100. Seam Welding Attachments

Electrical Maintenance & Engineering Co.—8-page illustrated bulletin "Seam Weld Attachments for Spot Welders" gives details of circular, circular open throat and parallel wheel units. Advantages of using attachments are described.

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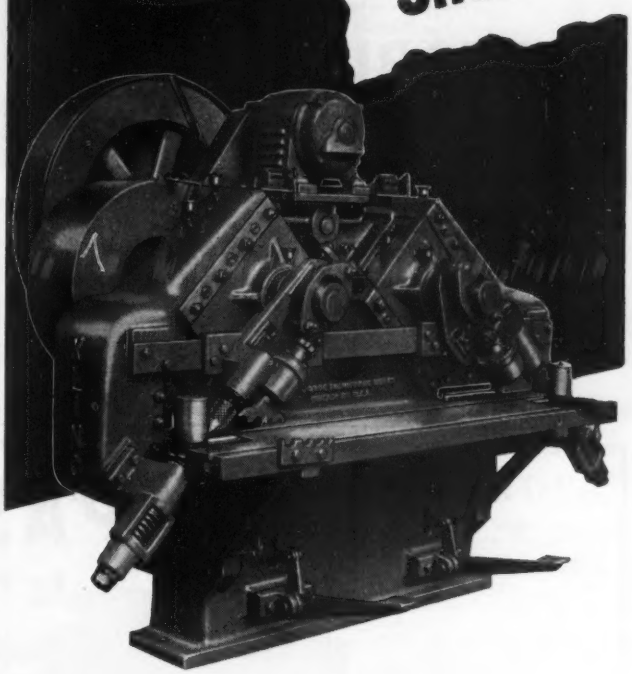

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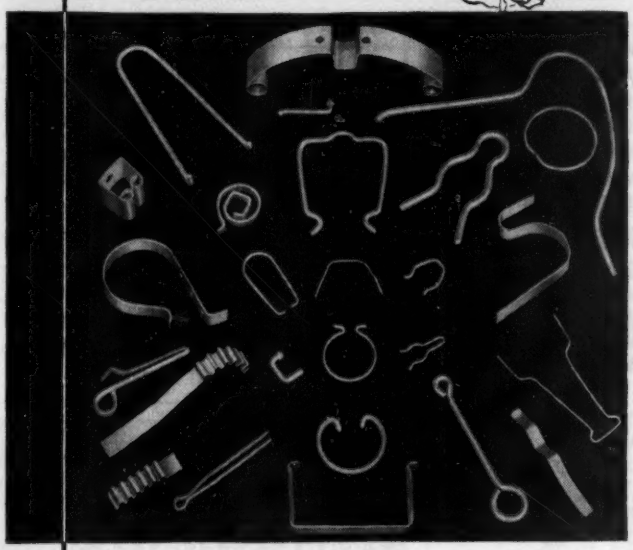

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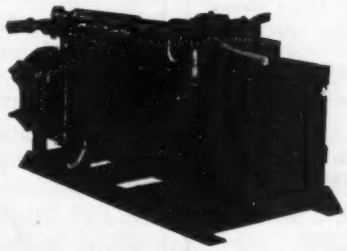

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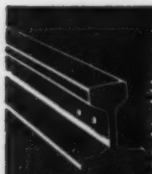

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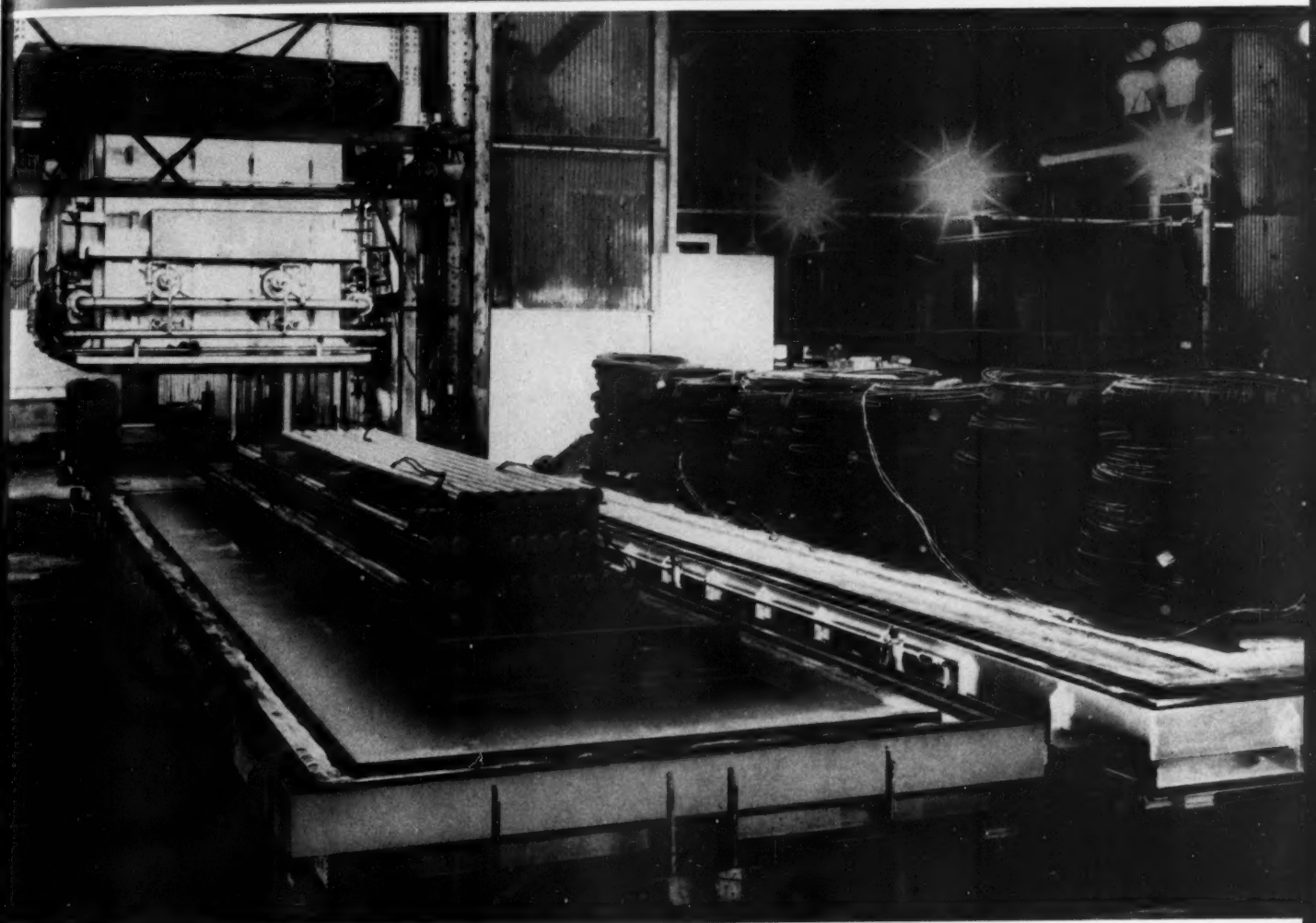

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